

Machine and Tool BLUE BOOK

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JUNE 1954

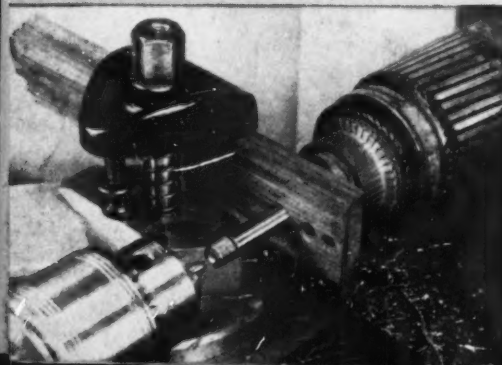
**Automatic Controls
For Indexing Operations**

**Pre-Coated
Metal Coil Saves Time**

Letters to the Editor

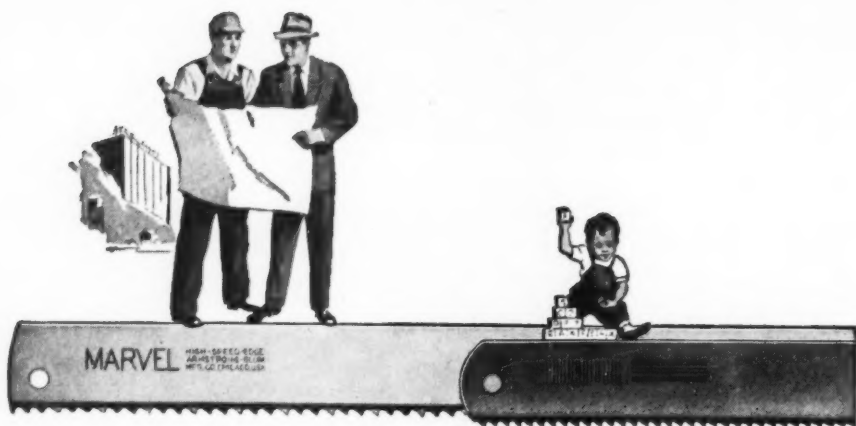
*Last Minute
Washington News*

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▲
STOCK STRAIGHTENERS
Come of Age

◀ **Simple Tricks
To Use With
LATHES**



...but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When—and if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



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and push down your shop costs



- ★ new method of driving the headstock spindle
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- ★ new pedestal cabinet with built-in chip pan and collet rack for 36 collets

Send for descriptive circular on the **WADE NO. 73 HAND SCREW MACHINE**

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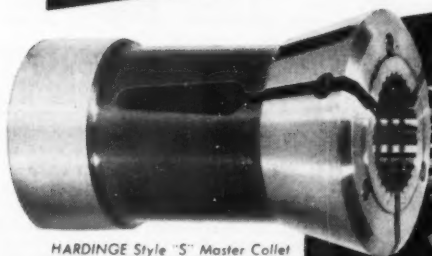
MAKERS OF
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W A L T H A M 5 4 M A S S U S A

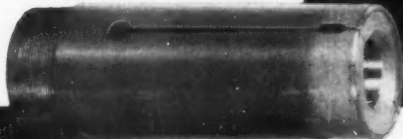
HARDINGE COLLETS and FEED FINGERS for Cone Automatics*

HARDINGE
ELMIRA, N.Y.

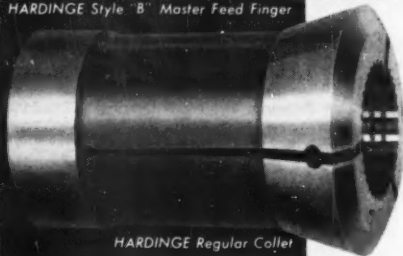
- Low Tooling Cost
- More Efficient Production



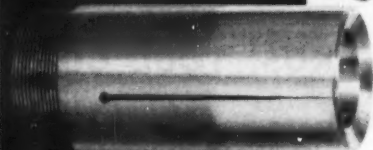
HARDINGE Style "S" Master Collet



HARDINGE Style "B" Master Feed Finger



HARDINGE Regular Collet

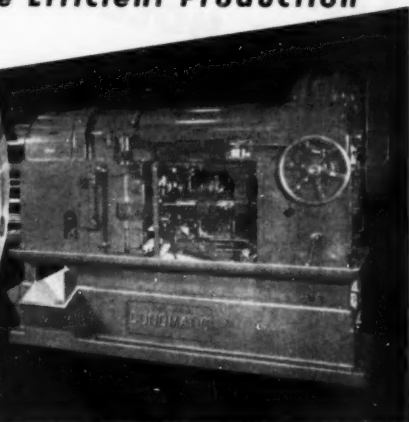


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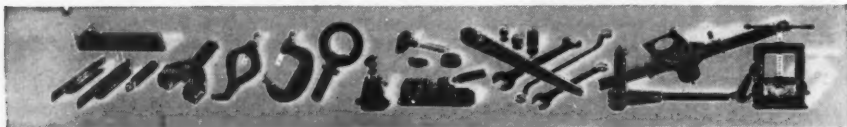
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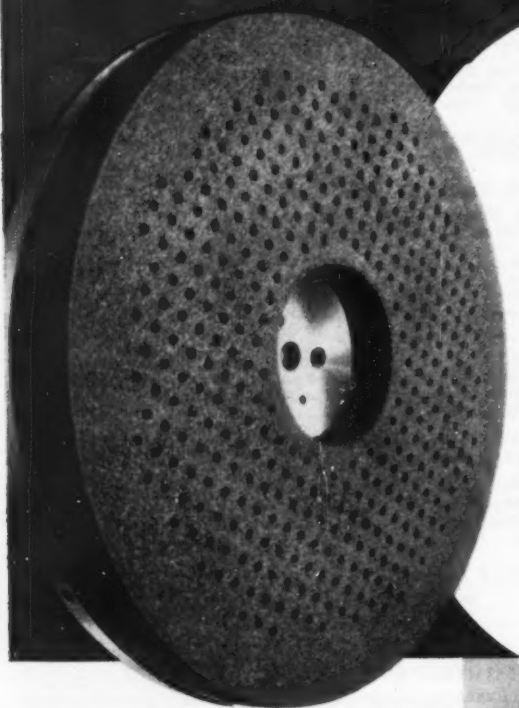
Hitchcock Managers are Listed on Page 64

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Authorized Office, Chicago, Ill.

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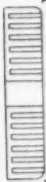


*Combining two grades in one disc
reduces cost and gives longer disc life*



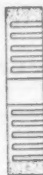
THE PROBLEM

To maintain a flat, true surface on the abrasive disc. Use of a single grade with deep corrugated face proved unsatisfactory. Outer edge of disc wore rapidly in shear cutting operation. Result: a tapered disc face, poor accuracy, frequent dressing.



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Manufactured by Mac-it Parts Co., Lancaster, Pa.



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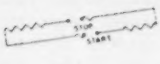
CINCINNATI

**Cincinnati
No. 2MI**

Horizontal Milling Machine
taking a heavy form milling cut

CINCIN

Are you provoked at slow toolroom milling operations and inaccurate work? Fed up with maintenance bills? You can cure these and other ills of high cost toolroom milling by replacing your old equipment with new CINCINNATIS in the No. 2 range, for example, with Nos. 2ML or 2MI. Reasons why these machines are good medicine for shops of all sizes are many.

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CINCINNATI

NATI

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A black and white photograph of a massive industrial planer machine. The machine's bed is composed of several long, parallel metal strips, each perforated with small holes. A worker in a light-colored coat stands on the left side of the bed, providing a sense of scale. The machine's complex mechanical structure, including a large cross-rail with a sliding headstock, is visible above the bed. The brand name 'GRAY' is printed on a panel of the machine's upper structure.

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Here is one of the year's largest planers. Like all Gray planers from king-size Giants to eager Cubs, it's built for high production, with more original engineering developments and production features than any other planer.

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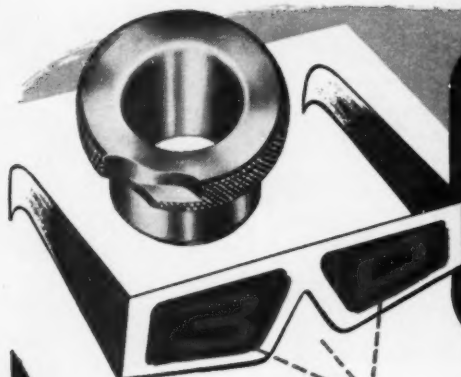
Prices start as low as \$1575.00

(Motor and all Electrical Equipment included)

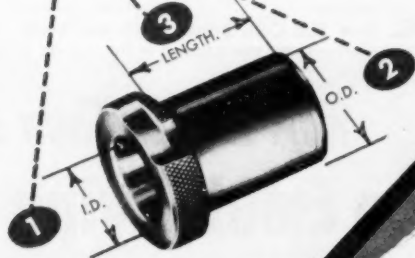


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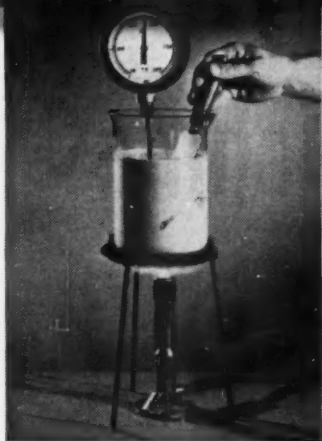
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Now Better Than Ever! **Sunoco Emulsifying Cutting Oil**

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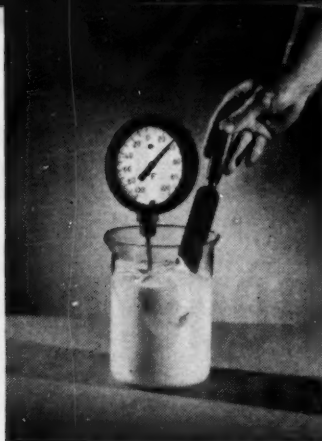
- **HIGHER MACHINING EFFICIENCY**—better finishes, longer tool life, increased production in cutting operations
- **INCREASED DETERGENCY**—particularly important in grinding operations—provides better surface finishes, prevents loading and glazing of the wheel, prolongs wheel life
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- **A PURER, CLEANER CUTTING OIL**—whiter, more stable emulsions; cleaner parts and machines; better operator acceptance
- **EASIER HANDLING**—pumps from storage tanks more readily, flows from drums faster
- **GREATER VERSATILITY**—can be used for rolling, washing and rust-proofing as well as cutting and grinding





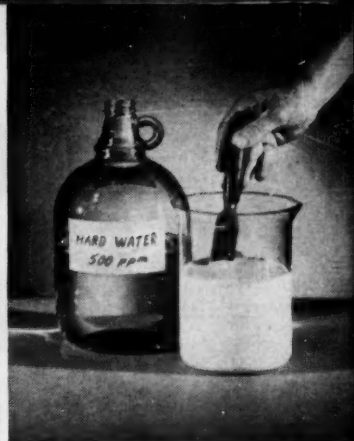
MIXES IN HOT WATER

This new S.E.C.O. mixes and remains stable even at 180 F., permitting its use in washing and rustproofing



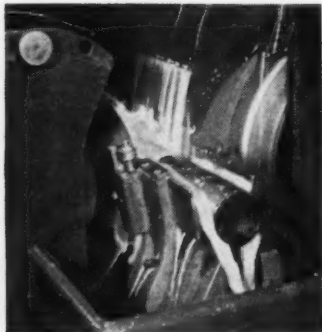
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New S.E.C.O. forms stable emulsions in the coldest water . . . even ice water does not affect it.

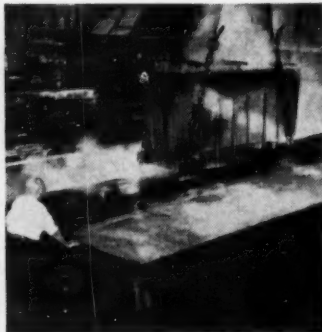


MIXES IN HARD WATER

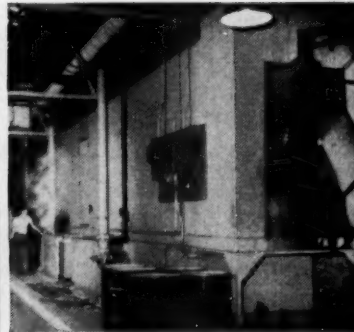
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GRINDING. New S.E.C.O. improves surface finishes because its increased detergency prevents loading and glazing of grinding wheels, prolongs wheel life.



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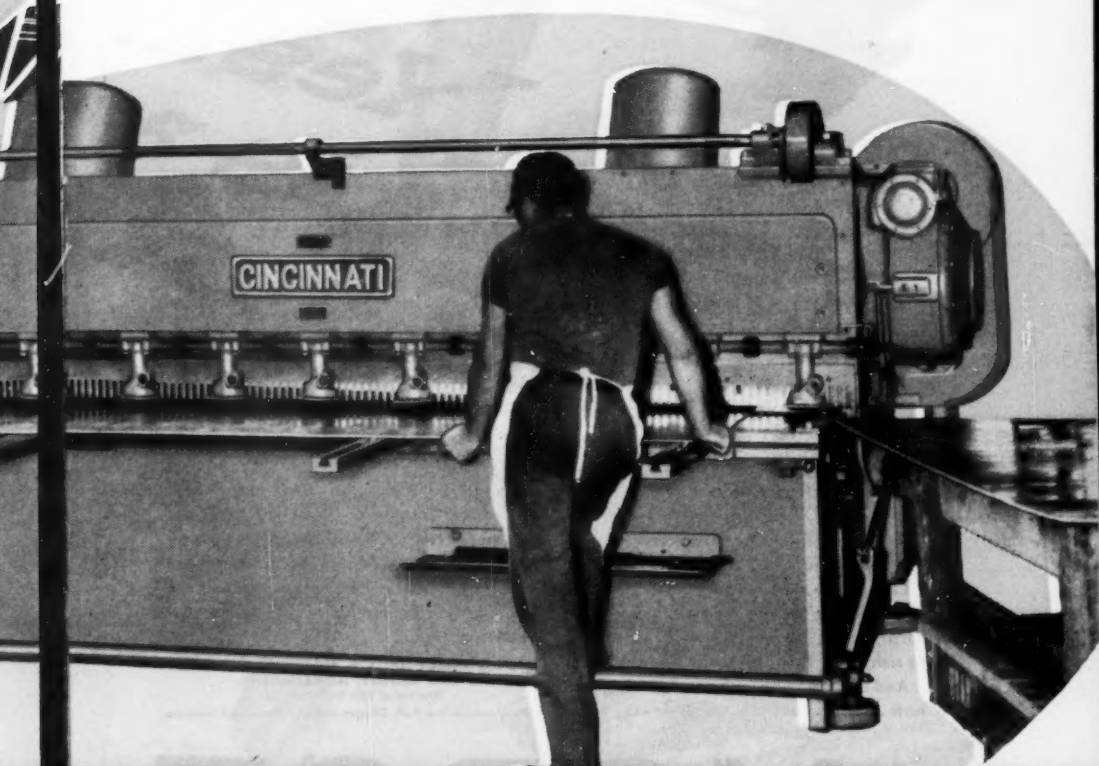
modern machines MAKE modern furniture...



Photos courtesy The Troy Sunshade Company, Troy, Ohio

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and carbide-tipped
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production boring machines.



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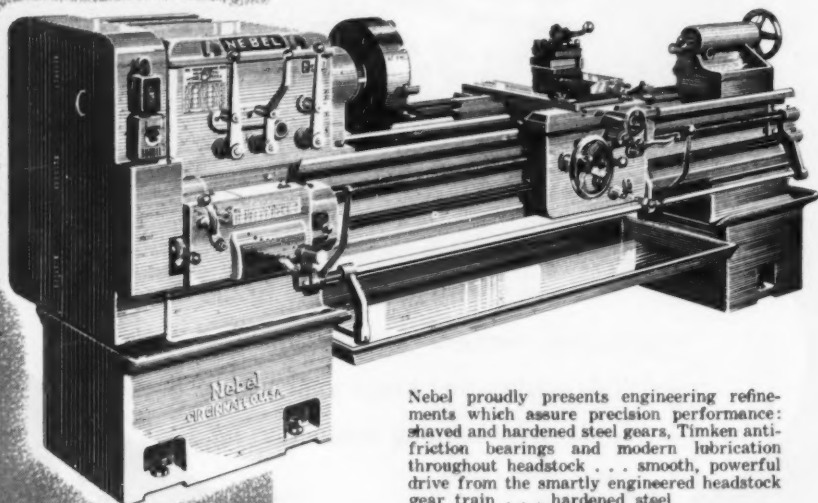
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the chuck that lives up to its name ... Supreme

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precision
performance

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- ★ Removable block gap
- ★ Extension bed gap



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- ☐ Send new 20" 'LA' engine and gap lathe bulletin

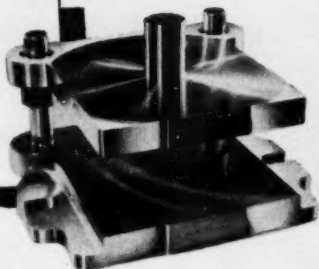
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Now—Danly unites mass production techniques with the precision touch of craftsmanship to bring you the fastest die set service... ever.

Never before has there been a die set service as fast as the one that Danly now offers to you. Unique in concept, the system had its beginning some years ago when Danly originated its network of nationwide Danly Branches. Under such a system the main Danly Plant in Chicago provided thousands of *interchangeable* die set parts to Danly Branch Plants. It meant that such parts were easily assembled into standard die sets and then quickly delivered to meet the requirements of any tooling program.

But, as buyers recognized the convenience of Danly service, demands on the Chicago Plant grew to exceed capacity. The solution? ... an unprecedented move in the die set field. Danly put die set manufacture on a mass production basis with no sacrifice of famous Danly precision. It was accomplished with amazing new facilities in the form of two complete production lines devoted exclusively to high speed, precision die set production. The next time you put one or a dozen Danly Die Sets on order, expect to get fast delivery from any Danly Branch, expect to get die sets unequalled in precision. You can expect it and you'll get it... when it's Danly.

Here's where faster die set service begins, on Danly's high speed precision production lines... the finest mass production facilities in the die set field.



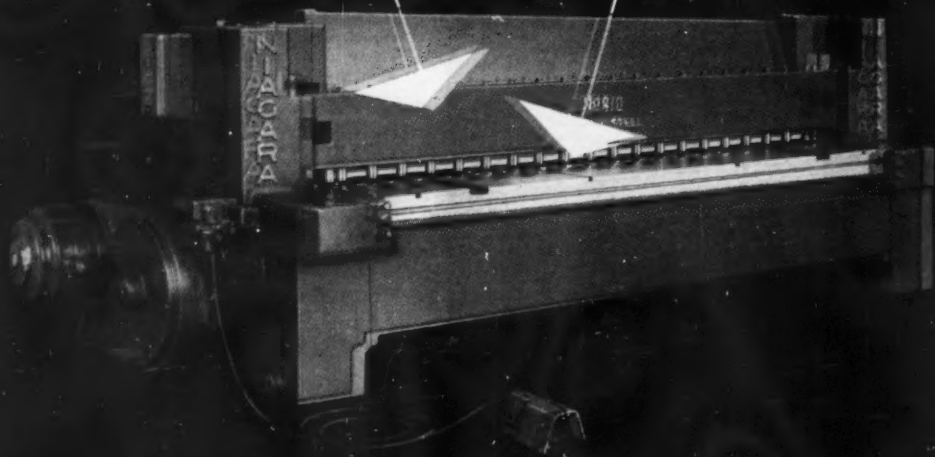
Fast, nationwide delivery from these plants

*CHICAGO 50	2100 S. Laramie Avenue
*CLEVELAND 14	1550 East 33rd Street
*DAYTON 7	3196 Delphos Avenue
*DETROIT 16	1549 Temple Avenue
*GRAND RAPIDS	113 Michigan Street, N.W.
*INDIANAPOLIS 4	5 West 10th Street
*LONG ISLAND CITY 1	47-28 37th Street
*LOS ANGELES 54	Ducommun Metals & Supply Co., 4890 South Alameda
*MILWAUKEE 2	111 E. Wisconsin Avenue
*PHILADELPHIA 40	511 W. Courtland Street
*ROCHESTER 6	33 Rutter Street

*Indicates complete stock.

Here's where your order is received... in one of Danly's Branch Plants. Because all die components are close at hand, your order is filled immediately.

SELF-COMPENSATING HOLDDOWN



*America's most complete line of presses, shears,
machines and tools for plate and sheet metal work*

a BIG FACTOR in the superiority of Niagara Shears

"STRAIGHT-EDGE" CUTTING ACCURACY

Positive, power actuation grips work securely for maximum cutting accuracy.

LOW IMPACT AVERTS DAMAGE AND INACCURACY

Individual pressure feet contact work with low impact, thus safeguarding both the material and bed against damage, as well as reducing noise level. No hammer-blows to mar work. No peening of bed with resulting distortion of knife seat.

SIMPLIFIED, LOW UPKEEP DESIGN

Simplicity of design and construction, involving a minimum number of parts, assures negligible servicing. With *less* to go wrong, there is *less* to repair and replace.

HOLDS WORK FLAT AND STATIONARY

Multiple pressure feet on 6" centers, applying uniform pressure, hold work flat and tight against bed to assure utmost shearing accuracy. No rippling of sheet between feet as cut progresses. Firm grip on short pieces.

HANDLES STOCK OF VARYING THICKNESS

Individual feet are self-compensating, requiring no adjustment for cutting stock of different thicknesses . . . even at the same time.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

DISTRICT OFFICES: Detroit • Cleveland • New York • Philadelphia

Dealers in principal U. S. cities and major foreign countries



In a power squaring shear, no *single* feature nor component can be fully responsible for accuracy, speed and economy. They result from a *combination* of features such as the self-compensating holddown; rigid, fully closed box section construction of bed and crosshead; low slope of upper knife; ample and accurately held cross-head guides; multiple point sleeve clutch — the very features that have established the marked superiority of Niagara's Underdrive Series.

For the whole story, straightforwardly presented, on America's most complete line of underdrive power squaring shears, with capacities from shim stock to 1 in. thick mild steel (lengths 3 to 20 ft.), request *Niagara Bulletin 69*. Write today.



NIAGARA

UNDERDRIVE SQUARING SHEARS

**WHY
YOU
GET**

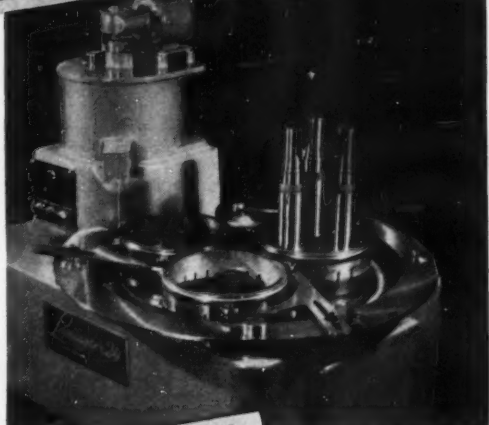
*Precision Flatness,
Finish and Parallelity
in Production Quantities...*

WITH A LAPMASTER

Here is the machine to do the job if you want precision flatness in production quantities at an economical rate. Lapmaster machines readily lap to the extreme close tolerance of one light band (0000116") or less. In addition, they produce an extremely fine finish to as low as 1 RMS.

Check these features and investigate the possibilities for the Lapmaster in your plant.

1. Operator requires no previous lapping experience.
2. Automatic timer provides controlled lapping cycle for production efficiency and allows time for pre-loading work-holders.
3. Simplicity of design allows ease of loading and unloading.
4. Loose abrasive distributed evenly over lapping area insures uniform results.
5. Serrated lap plate collects and disposes of spent compound and removed stock.
6. Precision laps identical parts or parts of various shapes, heights and materials in one cycle.
7. Self-conditioning lap plate eliminates down time for truing or replacement.



How the Lapmaster Works

The work being lapped causes wear on heavy cast iron lap plate.

As the work is wearing the lap, the conditioning rings are continuously conditioning the lapping plate surface.

Since the wear action of the conditioning rings is greater than the wear caused by the work being lapped, the flatness of the lap plate is automatically maintained.

FREE DATA



Learn more about the possibilities of production lapping and the interesting subject of measuring flatness. The illustrated fact-filled booklet is yours for the asking. Write today.

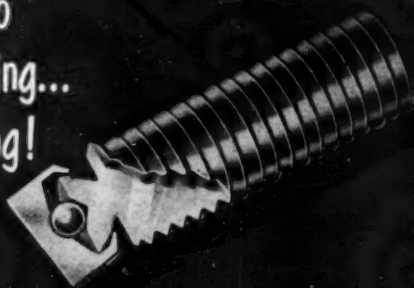
JOHN CRANE

Crane Packing Company,

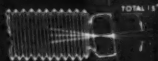
Dept. 88-6, 1812 Cuyler Ave., Chicago 14, Ill.

CRANE PACKING COMPANY

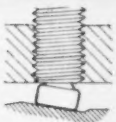
Here's the secret to
positive clamping...
freedom from marring!



SCREW-BALL CLAMPS!



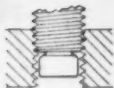
Ball-bearing construction insures frictionless, automatic angle adjustment and rotation; pad swivels freely in all directions up to 7½" from the centerline!



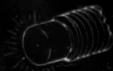
Pad seats firmly on work surface within angular range!



Force distributed equally to pad face. Conical seat distributes force equally in all directions; insures easy alignment in angular applications; greater freedom of motion.



Pad inserts from top of threaded hole or from bottom for easy installation!



Large pad area. Pad is machined from the solid, not counter-bored or relieved; has greater strength plus freedom from distortion!

NO MARRING! Frictionless, automatic angle adjustment and rotation; pad swivels freely in all directions up to 7½" from the centerline!

LOW COST! Ball-bearing construction insures easy alignment in angular applications; greater freedom of motion.

NO MARRING! Frictionless, automatic angle adjustment and rotation; pad swivels freely in all directions up to 7½" from the centerline!

NO MARRING! Frictionless, automatic angle adjustment and rotation; pad swivels freely in all directions up to 7½" from the centerline!

NO MARRING! Frictionless, automatic angle adjustment and rotation; pad swivels freely in all directions up to 7½" from the centerline!



VLIER ENGINEERING
INCORPORATED

MONEY-SAVING TOOLING SPECIALTIES FOR EVERY REQUIREMENT!



TORQUE THUMB SCREWS—
Apply accurate, controlled end pressures; eliminate distortion to the workpiece. 4 models; 19 sizes!



VLIER SPRING PLUNGERS—
For use wherever accurate, positive spring loads are needed! 4 models; 40 sizes!



VLIER SPRING STOPS—
Provide end pressures in fixtures when wall sections are not available. Two models: 14 and 32 lbs. end pressure.



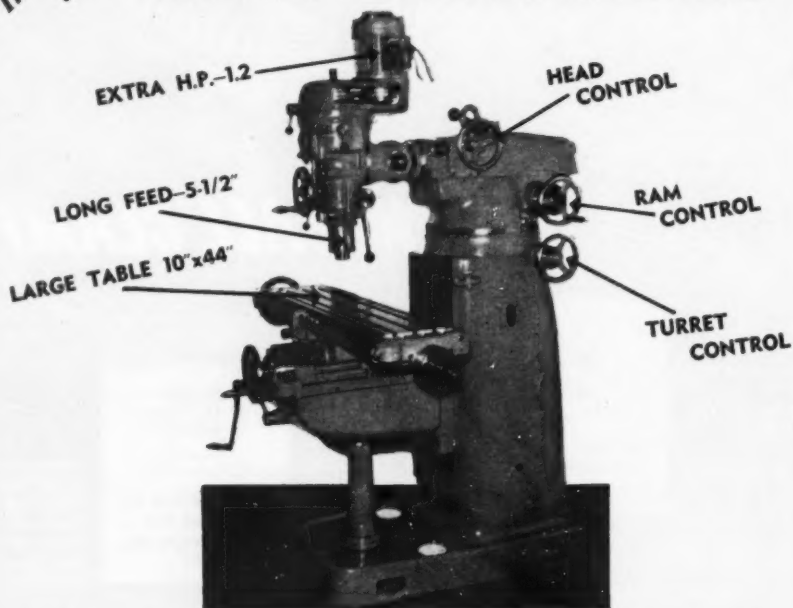
VLIER TOGGLE PAD—
Assure solid clamping of parts with uneven or off-angle surfaces. 5 sizes; fit almost any clamp.



VLIER FIXTURE KEYS—
New 5-Way Key fits every standard mill table slot. 3-Way model also available.

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**This machine has features, the combination of
which is found in no other miller.**

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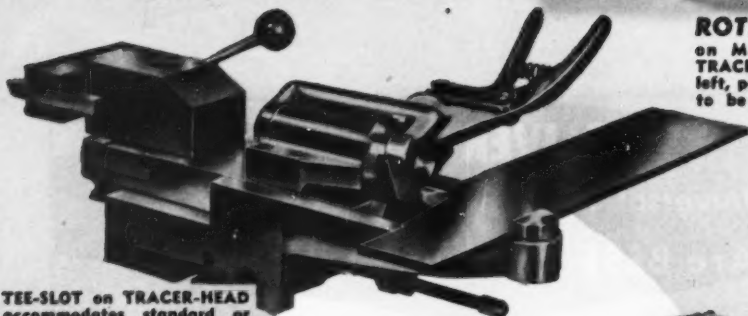
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by OLIVER include:

AUTOMATIC DRILL GRINDERS
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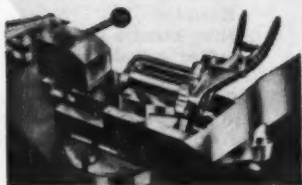
TEE-SLOT on **TRACER-HEAD** accommodates standard or quick change tool holders, square turrets, planer clapper box, grinding attachments, boring bars, etc.

ROTARY STYLUS —

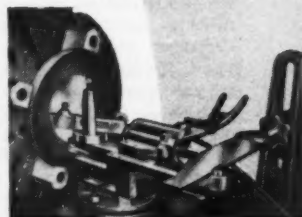
on Model M-1500 Lehigh **TRACER-TOOL**, illustrated at left, permits cross feed screw to be set and left in one position while successive pieces are machined or cuts are made. Speeds production. Assures accuracy even on old worn lathes.

Faster — lower cost LATHE DUPLICATING WITH ANY ENGINE OR TURRET LATHE

- No complicated electronic or hydraulic controls.
- Quickly set up without making permanent alterations to the lathe. Does not tie up costly capital equipment.
- Gives complete working visibility and chip clearance.
- Positive stylus contact assured by air pressure to tool through a 3-way valve and pressure regulator. Uses shop pressure.
- Horizontal slide on Tracer-Head operates between pre-loaded ball bearings. Precision built.
- Uses easily made, low cost, hardened templates.
- Proved in hundreds of shops of all sizes and in scores of major manufacturing and service industries for short and production runs.



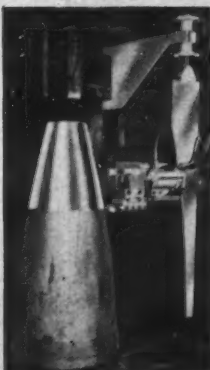
O.D. CONTOUR TURNING
— & tapering. Unlimited radii.



CONTOUR FACING
— on any engine or turret lathe.



I.D. BORING
— consisting of various blended radii as well as 90° steps.



BULLARD OPERATIONS
— including outside and inside tracing. Tracer-Head adapts to vertical ram.



CONTOUR GRINDING
— including internal and external contours.

JUST OUT—New Catalog
Lehigh **SOLENOID VALVES** For Complete **AUTOMATION** mailed on request

MODELS NOW AVAILABLE

EL-1100 to fit lathes 9"-14" Price \$375
M-1500 to fit lathes 16"-24" Price \$725
EL-2000 to fit lathes 24" & larger Price \$975

Prices subject to change without notice • Tool holder and template not included • Air valve and regulator supplied only with Models M-1500 and EL-2000.

ENGINEERING SERVICE

Our engineering department will be glad to advise you on any duplicating problem. Catalog and engineering bulletins on request.

AIR CONTROL DIVISION OF

Lehigh Foundries, Inc.

1502 LEHIGH DRIVE, EASTON, PA.



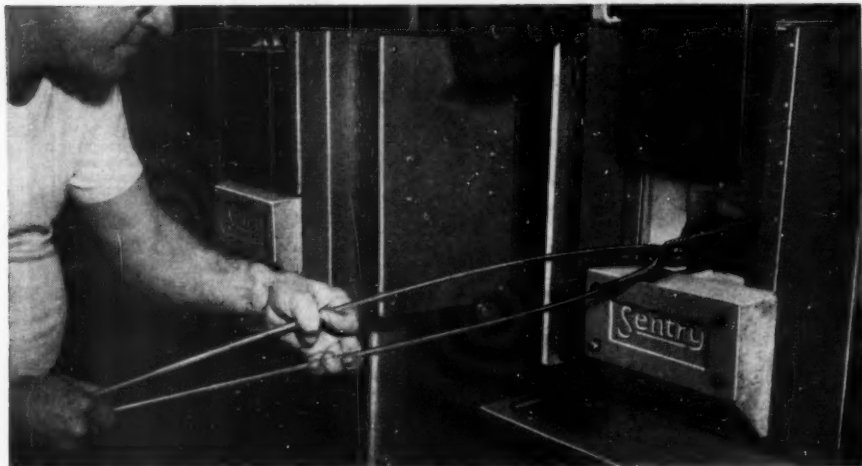
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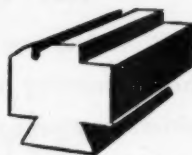
ELECTRIC FURNACES

FOR H.S.S. hardening



H.S.S. Heat Treating at New Britain Requires Accuracy

That's why they rely on Sentry Model Y electric Furnaces (see above) with the renowned Sentry Diamond Block atmosphere control. At the Screw Machine Products Division of the New Britain Machine Co., New Britain, Conn., they heat treat form tools, counter bores, reamers, gauges and fixtures, all of which must be completely free of decarburization and oxidation. Only Sentry is "Always on Duty" to guarantee this high performance.



This dovetail form tool must be perfect. The heat treating must be perfect also.



REQUEST CATALOG N-25.

For optimum hardness with complete protection against scale or decarburization, heat treat H.S. steels with Sentry Model "Y" Furnaces and Sentry Diamond Blocks.

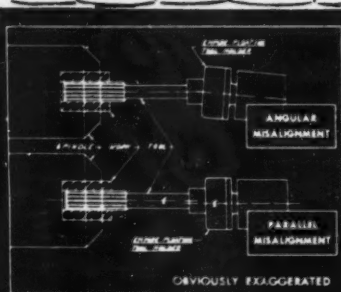
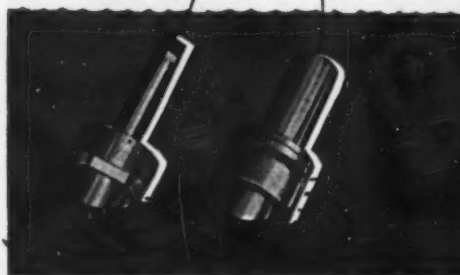
* High Speed Steel

Illustrates and describes all sizes of Models Y and YP Furnaces and The Sentry Diamond Block Method.



THE SENTRY COMPANY

*They
Really
Float*



EMPIRE FLOATING REAMER HOLDERS

and EMPIRE FLOATING TAP HOLDERS

And we do mean float!
These floating reamer and tap holders compensate for both out-of-parallel and angular misalignment and permit tap or reamer to float freely—in and out—and will not freeze under tension caused by drag.

By referring to the drawing you will note that the sleeve and shank float independently of each other—achieving a free and easy movement—a unique engineering design not found in any other floating tool.

With the Empire Floating Tool Holder you'll have no more bell mouths or over-sized holes. Holes can be reamed to close tolerances.

Ask about the Floating-Releasing Tap Holder

- that corrects for both parallel and angular misalignment
- that will not strip threads when tool is pulled out
- that permits adjustments of float in threading—right or left hand.

EMPIRE

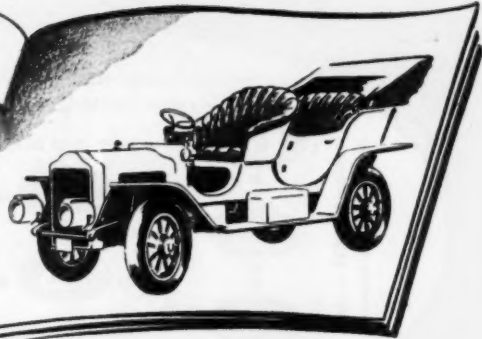
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TOOL COMPANY

DETROIT 13, MICHIGAN

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**TODAY'S PRODUCTION MACHINERY
REQUIRES MODERN CUTTING
AND GRINDING FLUIDS
FOR BEST PERFORMANCE..**

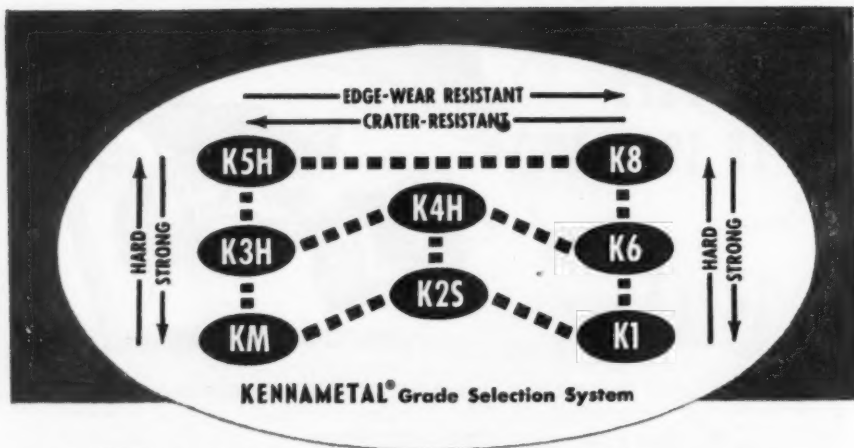


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LONGER TOOL LIFE...HIGHER RATE OF PRODUCTION...NO RUST...NO GUMMING...NO STINK!

Trim

A PRODUCT OF MASTER CHEMICAL CORPORATION • 13 HURON ST. • TOLEDO 1, OHIO



***NOW-* A Quick, Easy-to-Use Guide to Efficient Machining**

Here's the first simplified system for selecting carbide tool grades. Kennametal's new grade selection method assures top tool performance on every machining job. It's easy to use and eliminates guesswork because grades are grouped according to their wear characteristics (edge-wear and crater-resistant); also according to relative strength with strong, intermediate and hard grades included in each group. These eight Kennametal grades meet all machining requirements.

Kennametal's grading system is unmatched in the industry for simplicity. Any experienced machinist can use it to quickly adjust grades for

better tool performance. For example: If K3H is being used and crater is no problem, a switch to K4H, which is more edge-wear resistant, will provide longer tool life. Conversely, if K4H is being used and crater is excessive, a switch to K3H would improve tool life.

Your Kennametal representative will gladly help you apply this grade selection system to your machining operations. He can also help apply these eight grades to "wear spots" in your product, your processing lines, or any place a hard, wear-resistant metal is needed. Just give him a call. Kennametal Inc., Latrobe, Pa.

*Registered Trade Marks

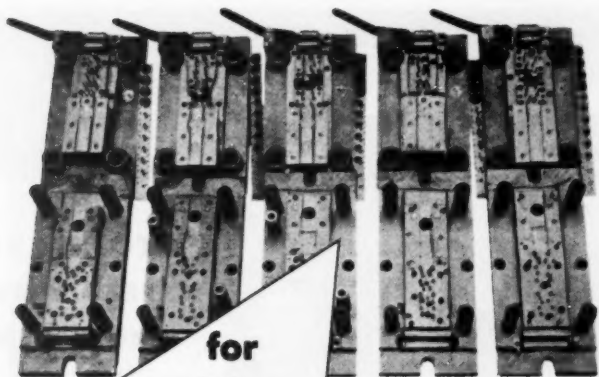


KENNAMETAL
CEMENTED CARBIDE TOOLING
THAT INCREASES PRODUCTIVITY



SALES
OFFICES
IN PRINCIPAL
CITIES

A-15



for
precision
jobs like this.... Moore Jig Borers
and Jig Grinders are
"MADE TO ORDER"



NO. 2 MOORE JIG BORER.
Range 10" x 16" x 16" height.
Features infinitely variable
spindle speeds, three power
feed ratios, centralized controls.



NO. 3 MOORE JIG GRINDER.
Range 10" x 16" x 16" height.
Grinding speeds from 12,000
to 60,000 rpm. Infinite feeds
up or down; spindle-housing
heat control; features slot
grinding attachment.

Moore Jig Borers and Jig Grinders are made to order for jobs that require precision hole location—and plenty of it.

Take, for example, these five progressive compound dies used to pierce, shave, gut and blank intricate timing-device parts.

Holes in punch plate and stripper were jig bored in a No. 2 Moore Jig Borer. Holes in the corresponding die parts were jig bored in the same precision machine, hardened and then jig ground in a No. 2 Moore Jig Grinder. Perfect line-up was insured, since all holes had to be held to $\pm .0002"$, both for position and hole size.

The No. 2 Moore Jig Borer, with its built-in system of accurate lead screws, can spot, drill, bore or ream all holes in a workpiece to "tenths" with minimum tool changes. The No. 2 Moore Jig Grinder can accurately contour grind, slot grind and form grind die sections in a third of the time required by other means.

These Moore toolroom teammates provide a one-two punch that can knock the fat off your diemaking costs. They supply an *Engineered Hole Location Service* that permits tool and die sections to be produced concurrently....puts diemaking on an interchangeable-parts-and-assembly basis....lengthens die life....saves you time and money all along the line.

Write today for our detailed literature that pictures and describes many toolroom and production jobs for which Moore Jig Borers and Jig Grinders are made to order.

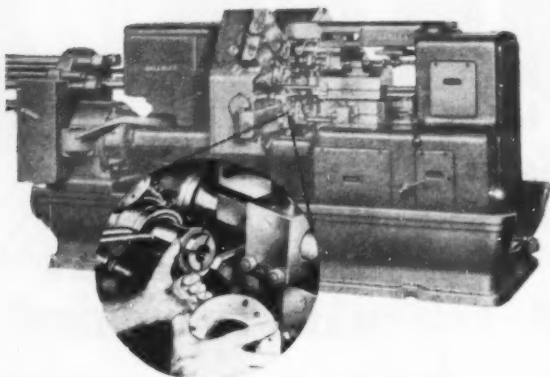
MOORE SPECIAL TOOL COMPANY, INC.
728 Union Ave., Bridgeport 7, Conn.

ADD  TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES

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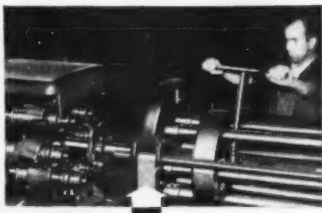
Automatics



COLLET AND FEED FINGER ARRANGEMENT

REDUCES
SET-UP
TIME

All six collets and feed fingers can be quickly and easily changed without indexing the spindle carrier. The collets are changed by simply removing the spindle nose nut. Greenlee collets are operated, as illustrated in the drawing, by the action of a sliding sleeve over the taper of the collet. The nose nut holds the collet in a fixed position inside the spindle, thus eliminating any endwise movement. As a result, none is transmitted to the stock, and this provides for accurate stock feed-out.



CHANGING PUSHER TUBES

A few turns of a wrench moves the head of the stock-reel backward to afford the operator plenty of room to change the stock pusher tube assemblies, after releasing and indexing retainer plate.



*Write for FREE
Literature*



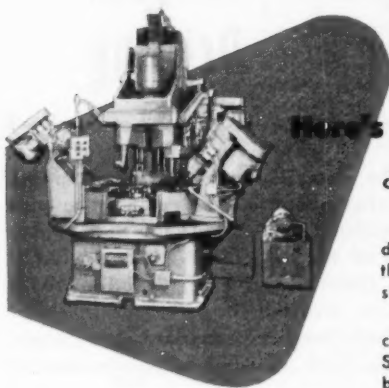
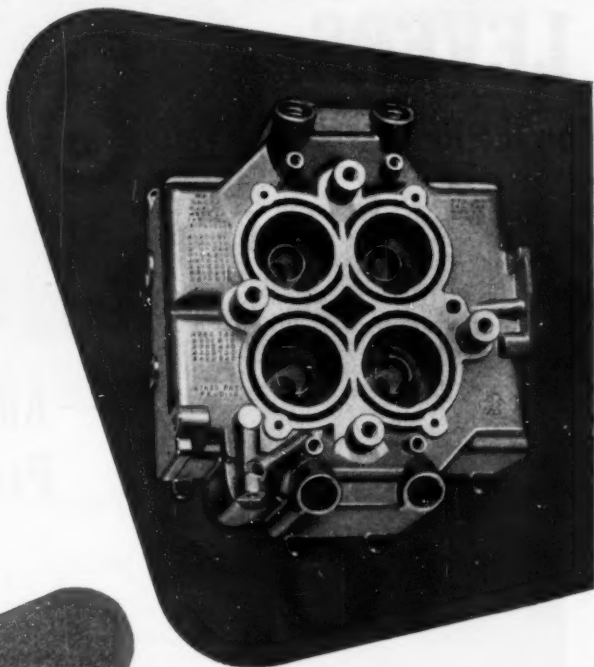
GREENLEE BROS. & COMPANY, 1836 MASON AVE., ROCKFORD, ILL.

MULTIPLE SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

How would you do all these operations?

... fast, with utmost precision, at lowest cost

DRILL	2	HOLES
TAP	2	HOLES
DRILL	2	HOLES
REAM	2	HOLES
TAP	2	HOLES
FACE	4	SURFACES
CLEANOUT	4	DIAMETERS
FACE	4	SURFACES
TAP	2	HOLES
REAM	2	HOLES
DRILL	2	HOLES
TAP	2	HOLES
DRILL	2	HOLES



Here's the Morris Mor-Speed answer

... combining 32 operations,
delivering up to 375 parts per hour!

Imagine the machines, and floor space required to do this part on a separate machine basis! Instead, there's just one machine, producing approximately six parts per minute!

Important too, there's no sky-high "special machine" price tag on this or any Morris MOR-SPEED. Standard machining units are grouped on a standard base, around a standard indexing table and provided with necessary tooling. The result is high production at lowest cost.

Although your multiple drilling, tapping, reaming and similar operations may not be as complicated as this Morris installation, chances are Morris Engineers can show you proof of substantial savings. Investigate today.



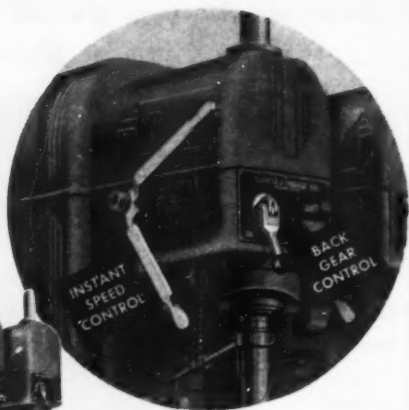
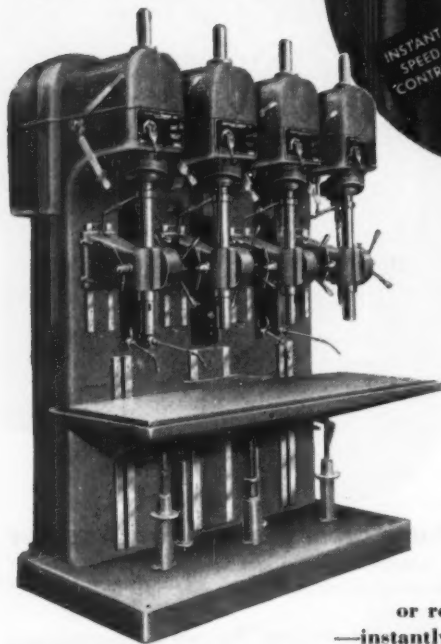
Morris

THE MORRIS MACHINE TOOL COMPANY,

937 HARRIET ST., CINCINNATI 9, OHIO

These 2 LEVERS

on the RPMster—



—Add an Extra
Profit Margin
to your
Drilling

The exact required speed for the size of drill, the material hardness or the tapping or reaming operation you're about to start—**instantly**, without shutting off the motor! It's not only a big convenience to the operator of the "Buffalo" RPMster, but it saves valuable minutes in every operation. These heavy, ruggedly built "drills with 1001 speeds" are setting some excellent profit-drilling records in shops industry-wide. Back gearing and power feed, too, are standard equipment. Better write today for Bulletin 3257A for the facts on these machines that all but think for the operator!



BUFFALO FORGE COMPANY

161 Mortimer Street

Buffalo, New York

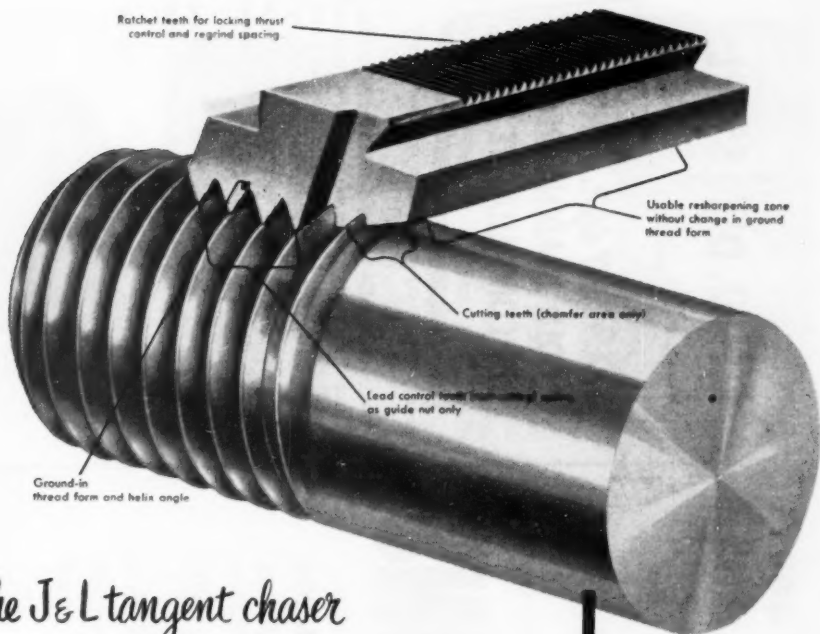
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING

• **PUNCHING**

• **SHEARING**

• **BENDING**



the J&L tangent chaser threading System assures...

... ease of operation ... maximum accuracy and tool economy — by means of a true tangent method of thread cutting exclusively developed by Jones & Lamson.

All four chasers in the set are positioned tangent to the work, making them cut like any other end cutting form tool. J&L tangent chasers have the thread form ground in at the exact helix angle for the size and pitch being threaded. Cutting action is confined to the chamfered area and the first full tooth in a set. The non-cutting teeth, purposely end ground above center, act as a precision lead nut. The non-cutting teeth on all four chasers act as a steady-rest and help control the lead with extreme accuracy. Class III guaranteed. *This means important savings regardless of your tolerance requirements.*



J&L Automatic Opening Die Heads and Chasers assure low initial cost — ease of operation — controlled resharpener — use of carbide where applicable. Class III threads guaranteed.

Write for free copy of new Jones & Lamson
Tangent Die Head OPERATOR'S MANUAL.



Tangent Stationary Type
Capacities from #4 to 2"



Tangent Revolving Type
Capacities from #4 to 2"



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THREAD TOOL DIV.

WHAT DOES FIRTH STERLING OFFER YOU?

(ANSWER NUMBER 3)

UNBIASED RECOMMENDATIONS

Producing *tools and tool materials* for the cutting, shaping and forming of metals is *major business* at Firth Sterling. Hence, capacity to serve you best necessarily embraces "full line tooling" . . . high speed tool steels *and* tungsten carbides, or *both* as needed.

So, you can count on *unbiased* tooling recommendations when you make Firth Sterling your *one* source of supply for *complete* shop tooling needs. We have no axes to grind!

What are the advantages to you?

1. An integrated tooling program that saves you money by matching tools to applications, without temptation to apply more expensive tools than may be necessary.

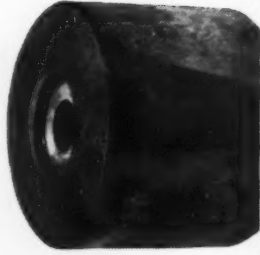
2. Improved production from wider selections. A choice

C.H.Q. DIE STEEL

hangs up... ANOTHER
COLD HEADING RECORD
IN COMPARATIVE TESTS!

A nationally known fastener manufacturer* recently made comparative tests of solid steel cold heading dies, under carefully controlled conditions, producing $\frac{3}{4}$ " square head machine bolts from 1020 steel on a Waterbury Farrel double stroke automatic.

Firth Sterling C.H.Q. came off with top honors and the highest production ever



to apply more expensive tools than may be necessary.

2. Improved production from wider selections. A choice of 97 different grades of high speed steels and tool and die steels *and* a dozen grades of carbides in everything from die nibs to an almost unlimited selection of standard and special carbide tools and tips.
3. The purchasing economies inherent to buying from one source of supply instead of from several.
4. The finest "packaged" tool line today for easy handling, stocking, identification in the tool crib, and inventory control.
5. The consistently high quality assured by 64 years of leadership in development of special purpose steels and 24 years of pioneering in carbide and powder metallurgy applications.

Makes sense, doesn't it? Call a Firth Sterling representative.

Firth Sterling Stands for Metallurgical Achievement—Past, Present, Future

1-9

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

OFFICES* AND WAREHOUSES: BIRMINGHAM* CHICAGO CLEVELAND DAYTON* DETROIT HARTFORD
HOUSTON* LOS ANGELES NEW YORK* PHILADELPHIA* PITTSBURGH* WASHINGTON* WESTFIELD, N.J.*

C. H. Q. solid die after 192,000 run.

obtained by this manufacturer from any steel die . . . 192,045 both ends. (78,860 one end, 59 Rockwell C; 113,185 other end, 61 Rockwell C). Standard competitive carbon steel dies produced only 50,000—60,000 both ends and ultimately failed by cracking axially. The C.H.Q. die wore oversize but longitudinally etched



Longitudinally etched section reveals no cracks.

section revealed not even a hair line crack. Ask for technical literature on C.H.Q.—or a Firth Sterling representative will discuss your die problems. His recommendations are unbiased . . . we make and sell *both* steel *and* carbide for every tooling need.

* (name on request)

P-10

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels

Tool & Die Steels

Stainless Specialties

High Temperature Alloys

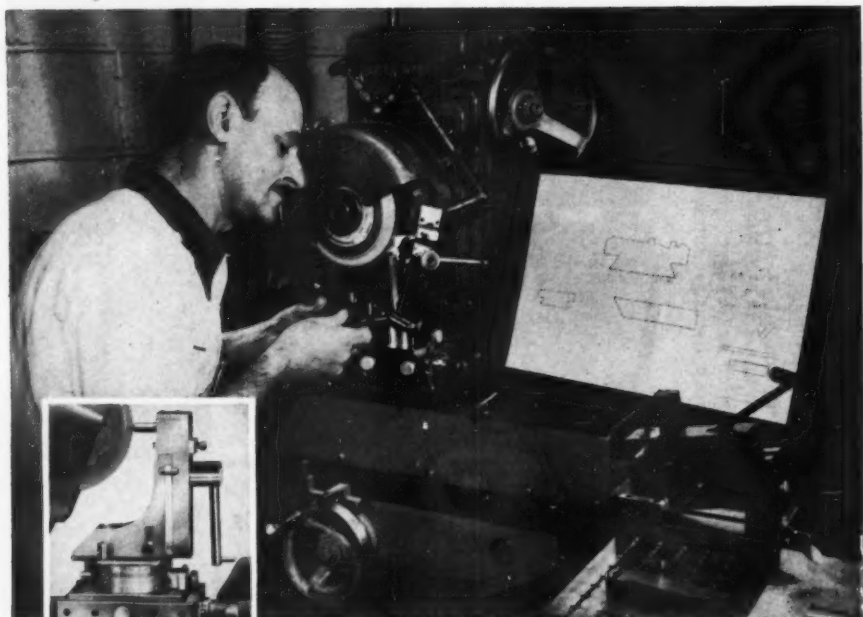


Sintered Tungsten Carbides

Firth Heavy Metal

Chromium Carbides

High Temperature Cermet



HERMAN CHARNEY SETS UP J & S WHEEL DRESSER FOR .050 CONCAVE DRESSING

Saves hours by setting angles in seconds, radii in minutes

A typical job made easier with a J & S "Fluidmotion" Wheel Dresser

Here's a wheel dressing job which calls for 13 angles, 4 radii, 7 flats. Ordinarily you might expect to spend from 5 to 30 minutes for each setting. With a J & S "Fluidmotion" Wheel Dresser, tool grinder Herman Charney made *all* 24 settings in just 21 minutes.

Time-saving Features

An unusual case? No — it's typical of the speed and ease of operating a J & S Wheel Dresser. Setting 2 angles with a "Fluidmotion" Dresser, for example, takes only 10 seconds. Setting a radius takes only 2-3 minutes.

Note just how easy it is to operate a J & S Wheel Dresser. All you need is a micrometer and a simple hex wrench. You can forget about gage blocks, height gages and master gage settings. No need to bother either with parallel bars, surface plates or dial indicators.

With the "Fluidmotion" Dresser, you can also dress two angles tangent to a radius in one continuous motion. After dressing the angles, the diamond automatically returns to center.

Accurate to 0.0001"

Accuracy? You can make concave and convex contours at a full 180 degrees with a guaranteed accuracy of 0.0001". J & S dressed forms, too, are always clean and precise. Angles and radii flow into each other, free of tool or chatter marks.

These are some of the benefits you get when you use a J & S "Fluidmotion" Wheel Dresser. A variety of models are available for dressing wheels up to 24" in diameter. Construction in all cases is of high-carbon, high-chrome steels.

Write for complete information today



WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

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has won favor throughout industry as one of the most efficient methods of imparting extra wear to the surfaces of gages, parts and tools.

This method employing the Linde Process applies a thin wear-resistant coating of tungsten carbide in wearing surfaces to extend the life of gages and hundreds of tools many times over.

Carb-O-Plating gives you wear life of carbide at a cost substantially lower than the use of solid material can give you. And because of the steel base, the products have resistance to mechanical shock and are not subject to breakage as can occur with sintered carbide. Carb-O-Plating also increases accuracy.

If you don't know about Carb-O-Plating, you're missing many advantages. Let us explain.

THE PLUS IN PRECISION

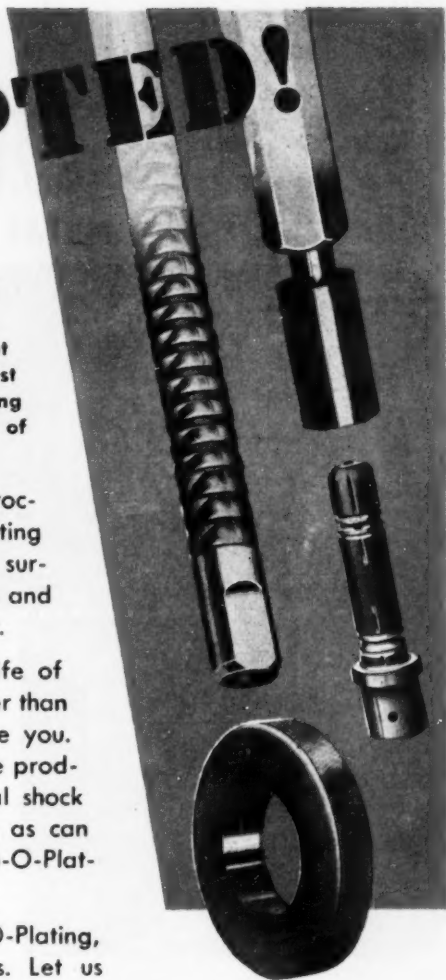
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DESIGNERS AND MANUFACTURERS OF: SPECIAL AND STANDARD CARBIDE CHROME PLATED AND STEEL GAGES
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FOR EVERY METAL MARKING NEED



Flat Die for marking round pieces



Roll Die for marking flat pieces



Embossing Dies

There's a Noblewest steel marking die for rolling or stamping sharp, clear, permanent impressions into every type of metal surface—round, flat, concave, convex and irregular contours. Long the standard for quality, Noblewest dies are made of especially selected steel, precision engraved to extremely close tolerances and heat treated for extra long wear. Each is rigidly inspected and Rockwell tested for hardness. For extraordinary quality dies at ordinary prices, always specify Noblewest.

Send detail specifications to The Noble & Westbrook Manufacturing Company,
Westbrook Street, East Hartford 8, Connecticut.

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ORIGINATORS OF THE ROLL MARKING PROCESS

NOBLEWEST
IMPROVED
MARKING
DEVICES

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you can buy
cost no more!**

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Finest Circular
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Through many years of providing America's leading industries with interchangeable and standardized punches, die buttons and retainers, R-B has built a reputation for increasing production, lowering costs and saving time. R-B case histories of savings and benefits include users of cam actuated, multi-station progressive, forming, blanking, piercing, embossing and combination dies of all sizes and types.

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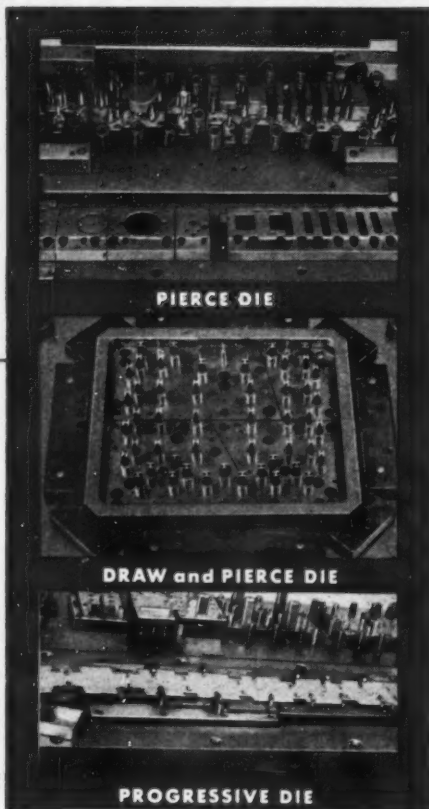
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**CO-ORDINATION
Produces Carbide
Tools That Link
the World's Finest
Machine Tools to
TOP-PRODUCTION!**



Maximum production is possible only when you have coordination of:

1. The creation of the proper grade of carbide.
2. Tools designed to get the utmost efficiency from that carbide.
3. The intelligent application of both to a machine tool designed for maximum production.



WESSON COMPANY

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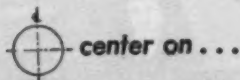
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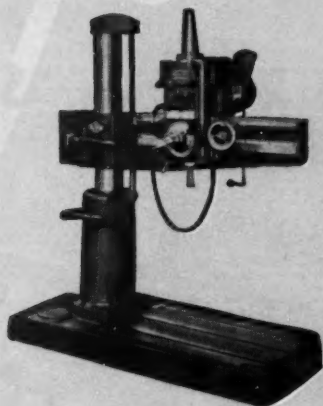
J.R.WILLIAMS

HERE COMES
THE BOSS!
THIS'LL BE
BETTER THAN
LAST WEEK
WHEN HE
CAUGHT
LATHEDOG
WITH A SPOON
IN HIS SPINDLE
STIRRING HIS
COFFEE AT
2420 R.P.M.!



J.R. WILLIAMS
Capt. 1953 by NEA Service, Inc.

Large-size prints of this
J. R. Williams cartoon
are available.



A Cincinnati 3/7" Radial is versatile enough to do the vast majority of the jobs in an average shop. Its 1" capacity will handle almost every drilling need. It costs far less than high-priced radials, yet it has high-priced features.

1. Unit construction throughout
2. Simple direct drive
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Also available, a complete line of engine, toolroom and gap-bed lathes and a complete line of floor and bench-type drilling machines.

For complete catalogs, prices and name of your local dealer, write on company letterhead to Cincinnati Lathe & Tool Co., 3256 Disney, Cincinnati 9, Ohio.

lathes and drills





. basic tools in a
universally accepted
method of check-
ing screw
threads

VK Set No. 20 HS
Thread Measuring
Wires, accurate to
 $\pm .000025"$ for 20 com-
mon pitch Unified and
American screw
threads, 6 to 36 threads
per inch.

The Van Keuren Catalog
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threads. This informa-
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The three-wire method is probably the best known and most
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Van Keuren Thread Measuring Wires have been developed over
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specifications, are held within .00002" for roundness, straight-
ness and identity and to within .000025" of exact size.

VK Thread Measuring Wires are made of long-wearing, tough
and beautifully finished high speed steel and are either $1\frac{1}{8}"$
or $2"$ in length. Every wire is subjected to the closest criteria
in today's standards of accuracy.

In addition to set No. 20, shown here, VK furnishes many
other standard sets as well as special wires in diameters from
.001" to 1.500".

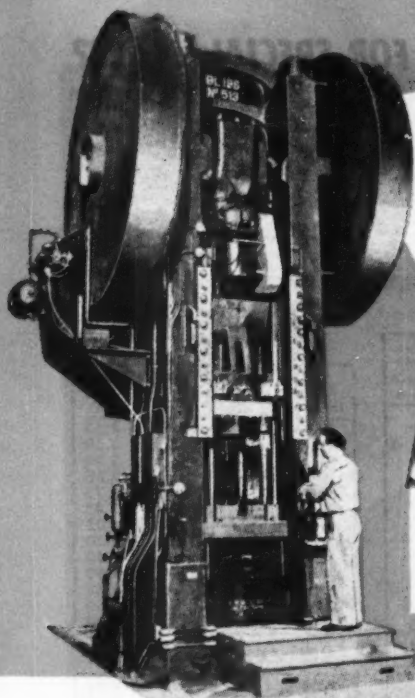


THE *Van Keuren* CO.

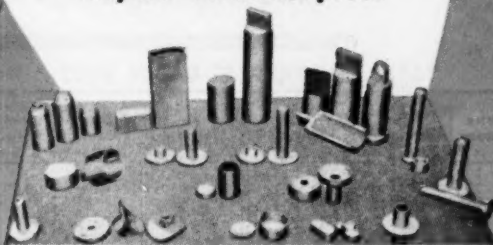
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Light Wave Equipment • Light Wave Micrometers • Gage
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**Lockheed relies on this
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and saves thousands over conventional machining methods

This press, largest of its kind in the aircraft industry, has saved Lockheed up to 75% in time as compared to machining, and up to 90% in material.

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Sid Tool Company

WHY WAIT FOR SPECIAL DRILLS?

... Has them **IN STOCK**
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Extra Long Length High Speed Drills—Straight Shank

TAPER LENGTH WIRE GAUGE SIZES

Wire Gauge Nos.	Price Each	Length Overall Inches	Approx. Length of Twist Inches	Wire Gauge Nos.	Price Each	Length Overall Inches	Approx. Length of Twist Inches
1	\$1.00	6 1/8	3 3/4	31	.70	5 1/8	3
2	1.00	6 1/8	3 3/4	32	.70	5 1/8	3
3	1.00	6	3 3/8	33	.70	5 1/8	3
4	1.00	6	3 3/8	34	.70	5 1/8	3
5	1.00	6	3 3/8	35	.70	5 1/8	3
6	1.00	6	3 3/8	36	.70	4 3/8	2 1/2
7	1.00	6	3 3/8	37	.70	4 3/8	2 1/2
8	1.00	6	3 3/8	38	.70	4 3/8	2 1/2
9	1.00	6	3 3/8	39	.70	4 3/8	2 1/2
10	1.00	6	3 3/8	40	.70	4 3/8	2 1/2
11	.90	6	3 3/8	41	.60	4 3/8	2 1/2
12	.90	6	3 3/8	42	.60	4 3/8	2 1/2
13	.90	5 3/4	3 1/2	43	.60	4 1/4	2 1/4
14	.90	5 3/4	3 1/2	44	.60	4 1/4	2 1/4
15	.90	5 3/4	3 1/2	45	.60	4 1/4	2 1/4
16	.90	5 3/4	3 1/2	46	.60	4 1/4	2 1/4
17	.90	5 3/4	3 1/2	47	.60	4 1/4	2 1/4
18	.90	5 3/4	3 1/2	48	.60	3 3/4	2
19	.90	5 3/4	3 1/2	49	.60	3 3/4	2
20	.90	5 3/4	3 1/2	50	.60	3 3/4	2
21	.80	5 3/8	3 1/2	51	.50	3 3/4	2
22	.80	5 3/8	3 1/2	52	.50	3 3/4	2
23	.80	5 3/8	3 1/4	53	.50	3	1 3/4
24	.80	5 3/8	3 1/4	54	.50	3	1 3/4
25	.80	5 3/8	3 1/4	55	.50	3	1 3/4
26	.80	5 3/8	3 1/4	56	.50	2 1/4	1 1/8
27	.80	5 3/8	3 1/4	57	.50	2 1/4	1 1/8
28	.80	5 3/8	3 1/4	58	.50	2 1/4	1 1/8
29	.80	5 3/8	3 1/4	59	.50	2 1/4	1 1/8
30	.80	5 3/8	3 1/4	60	.50	2 1/4	1 1/8

S Set \$1—1 ea. \$1-60 Long Drills. Consists of 60 Drills \$40.00

E Set \$2—1 ea. Letter A-Z Long Drills. Consists of 26 Drills 40.00

T Set \$4—1 ea. 1/8 to 1/2 Extra Long Drills. 12" Overall,

9" Flute. Consists of 25 Drills x 64ths 53.00

STRAIGHT SHANK 12" LONG 9" FLUTE

Size Inches	Price Each Net	Size Inches	Price Each Net
1/8	\$1.65	5/16	2.25
9/64	1.65	21/64	2.50
5/32	1.65	11/32	2.50
11/64	1.65	23/64	2.75
3/16	1.65	3/8	3.05
13/64	1.80	25/64	3.05
7/32	1.80	13/32	3.05
15/64	1.95	27/64	3.30
1/4	1.95	7/16	3.30
17/64	2.05	29/64	3.60
9/32	2.05	15/32	3.60
19/64	2.25	31/64	3.60
		1/2	3.60

15" LONG 12" FLUTE

17/32	\$7.00	21/32	9.00
9/16	7.70	11/16	9.10
19/32	8.25	23/32	9.35
5/8	8.80	3/4	9.50

Taper Length Letter Sizes STRAIGHT SHANK

Size	Price Each	Length Overall Inches	Approx. Length of Twist Inches
A-E	\$1.64	6 1/8	4
F-K	1.71	6 1/4	4
L-N	1.78	6 3/8	4 1/8
O-R	1.86	6 1/2	4 1/4
S-U	2.00	6 3/4	4 1/4
V-Y	2.14	7	4 3/8
Z	2.29	7 1/4	4 3/8

TAPER SHANK

Size	Price Each	Length Inches	Twist Inches	Shank Size	Size	Price Each	Length Inches	Twist Inches	Shank Size
33/64	\$7.15	17	13	No. 2 M.T.	47/64	\$ 9.50	17	13	No. 2 M.T.
17/32	7.15	17	13	No. 2 M.T.	3/4	9.50	17	13	No. 2 M.T.
35/64	7.70	17	13	No. 2 M.T.	25/32	10.20	17	13	No. 2 M.T.
9/16	7.70	17	13	No. 2 M.T.	13/16	12.00	18	13 3/8	No. 3 M.T.
37/64	8.25	17	13	No. 2 M.T.	27/32	12.50	18	13 3/8	No. 3 M.T.
19/32	8.25	17	13	No. 2 M.T.	7/8	13.20	18	13 3/8	No. 3 M.T.
39/64	8.60	17	13	No. 2 M.T.	29/32	13.75	18	13 3/8	No. 3 M.T.
5/8	8.60	17	13	No. 2 M.T.	15/16	14.30	18	13 3/8	No. 3 M.T.
41/64	9.00	17	13	No. 2 M.T.	31/32	15.40	18	13 3/8	No. 3 M.T.
21/32	9.00	17	13	No. 2 M.T.	1	17.60	20 1/2	15 3/8	No. 3 M.T.
43/64	9.10	17	13	No. 2 M.T.	1-1/16	18.70	20 1/2	15 3/8	No. 3 M.T.
11/16	9.10	17	13	No. 2 M.T.	1-1/8	19.80	21 1/2	15 3/8	No. 4 M.T.
45/64	9.35	17	13	No. 2 M.T.	1-3/16	22.00	21 1/2	15 3/8	No. 4 M.T.
23/32	9.35	17	13	No. 2 M.T.	1-1/4	24.00	21 1/2	15 3/8	No. 4 M.T.

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Sid Tool

CO., INC.

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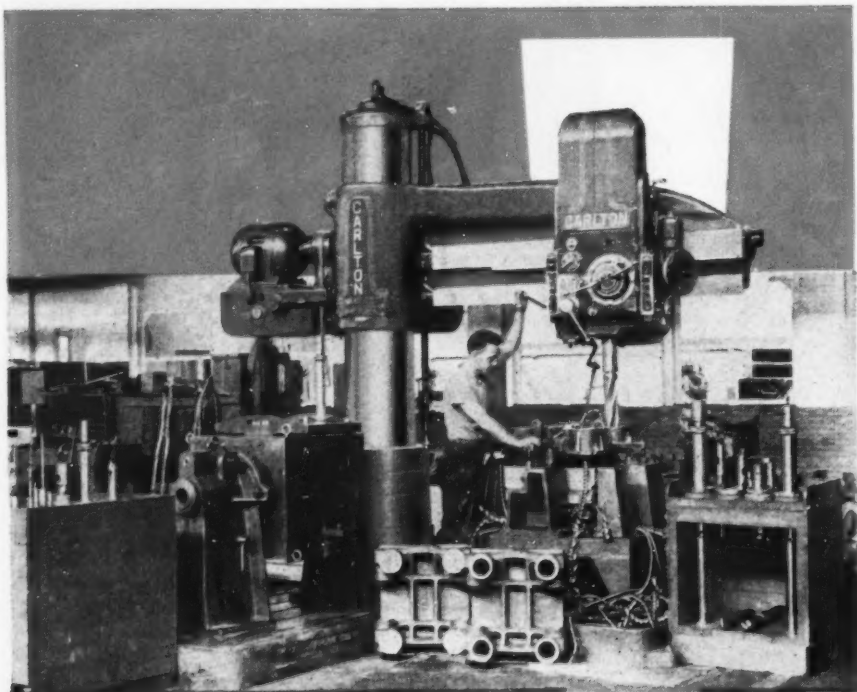
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SAW AND STEEL CO.

FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon • Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y. • Simonds Abrasive Co., Philadelphia, Pa., and Arvida, Que., Canada

A "Red Tang" File cuts fast and easy — produces curled chips like the cutting tool on a lathe. You get the smoothest, cleanest filing you've ever seen . . . *without* the "elbow grease". A man can really get the "feel" of a "Red Tang", do *more and better* work in less time.

There's a "Red Tang" File for every machinist's job. Simonds makes only one quality — Grade A. Get prompt delivery from your Industrial Supply Distributor today.



Carlton

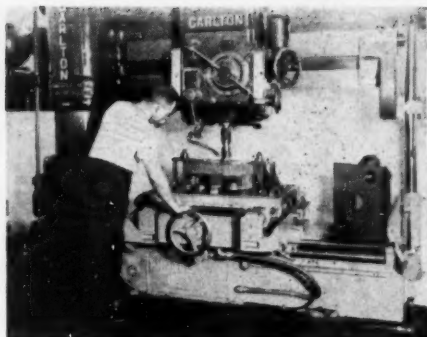
RADIAL DRILLS

Revolving Stands used under Carlton radial drills reduce boring and drilling costs 24.3% at Reed-Prentice Corp., Worcester, Mass. In the photo directly above, the Carlton radial has a double right-angle base which permits operator to work on the job at right while the one on the other base is being set up. This arrangement keeps the spindle drilling continuously.

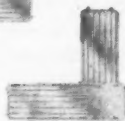
Carlton Radial Drills are perfectly suited to production drilling, and when properly tooled, can reduce costs considerably over the horizontal method. The pushbutton control simplifies and speeds up operation. The low hung drive assures the necessary rigidity. And the accuracy and precision with which the Carlton column clamp performs eliminates needless clamping and unclamping.

Drilling versatility and accuracy.

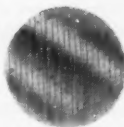
Holes from 5" to 3/8" in diameter are drilled in this set-up which shows a Bullard Man-Au-Trol spacer mounted on a 4A Carlton radial drill. Using the guide, the operator drills and bores a 5" center hole and two 4" tie-bar holes, and drills and taps 24 small holes in this Reed-Prentice plastic injection molding machine die plate.



4-WAY BASE



RIGHT-ANGLE BASE



FULL ROUND BASE

..... Variety of bases fit all production hole drilling requirements.

Carlton radial drills can be furnished with any of seven different types of stationary bases, three of which are shown here. And, there's a special track type mounting and a variety of plain or uni-tilt tables and revolving jigs . . . so that with Carlton you're sure to get the most efficient and profitable set-up for your requirements.

Cut Costs 24.3% at Reed-Prentice

Carlton Engineered . . . Carlton Tooled.

Carlton engineers will be glad to work with your engineers in recommending the most efficient tooling for your Carlton radial drill . . . in making time studies and furnishing tooling costs. Just send us your requirements and we'll submit our recommendations promptly and without obligation.

Use convenient coupon. The Carlton Machine Tool Co., Cincinnati 25, Ohio.

Gentlemen: Send us your recommendation on how the Carlton radial drill, properly tooled, can save us money on the attached drilling requirements.

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"Switching to NILSON 4 SLIDES Saved us \$17,656 on metal alone"

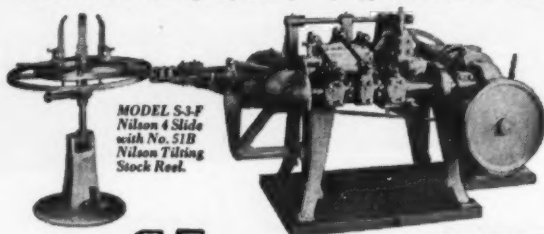


Yes, simply by changing stamping methods, this NILSON Customer profited 4 ways:

1. Production increased 80%.
2. 72% less metal used (per 4 million pieces).
3. Greatly improved quality with minimum of rejects.
4. Strengthened competitive position with greater profit margin.

You, too, can enjoy these advantages in producing your own wire forms and small metal stampings. Parts such as illustrated in the margin were straightened, fed, pierced, blanked, swaged, stamped or coined, cut-off and formed **AUTOMATICALLY** in NILSON 4 SLIDES in one quick precise operation. **ONE Machine. ONE Operator.**

NILSON 4 SLIDES available in wide range of sizes: forming Wire up to $\frac{1}{4}$ " diam. in feeds to 32" max. and Metal Ribbon stock up to $3\frac{1}{2}$ " wide. Press sections 5 to 30 ton capacity. Heavy Duty Types in 50 and 75 ton models.



MODEL S-3-F
Nilson 4 Slide
with No. 51B
Nilson Tilting
Stock Reel.

THERE'S **NILSON** NOTHING LIKE A

Write, Wire, Phone
for full particulars.

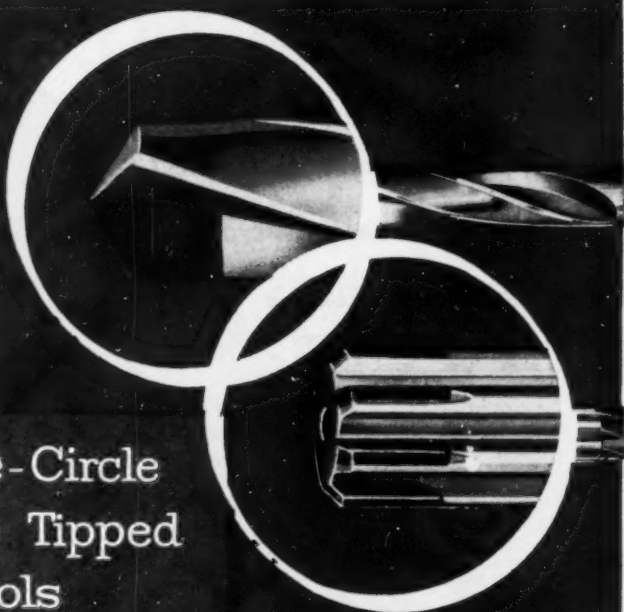
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1514 Railroad Avenue • Bridgeport 5, Connecticut

Automatic Chain-Making Machines • Automatic Single Forming Machines • Wire and
Stock Reels • Foot Presses • Wire Straightening Equipment • Slide Feeds for Presses

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cutting
mileage

Double-Circle Carbide Tipped Tools



An enlarged view of Double-Circle carbide inserts can only give you a minor part of the story of their cutting magic. These splendid tools have a "beneath-the-surface" story that is the true key to their superiority. In a word, this is the vast experience of Chicago-Latrobe in cutting tool engineering, in selection and testing of materials and in precision manufacturing methods. It is not surprising that wise buyers everywhere look to Chicago-Latrobe's complete line for the tools that make cutting operations faster, smoother, easier. For greater cutting mileage, always specify Double-Circle carbide tipped drills and reamers.

YOU'LL GET ← QUICK SERVICE →
FROM A CHICAGO-LATROBE DISTRIBUTOR



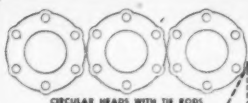
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✓ **EXTRA HIGH SAFETY FACTOR!**

✓ **DEPENDABILITY . . . backed
by 38 Years of Know-How!**



**SPACE
SAVED**

T-J SPACEMAKERS . . . provides additional room for
adjacent equipment without sacrificing strength.

NEW T-J

Spacemaker

AIR CYLINDERS

Streamlined design of the new T-J Spacemaker eliminates tie rods . . . saves up to 40% in mounting space! It's performance-proved . . . super rugged with extra high safety factor . . . solid steel heads . . . heavy wall, precision honed, hard chrome plated, seamless steel body . . . leakproof cylinder head to body construction . . . heavy duty, hi-tensile, hard chrome plated piston rod.

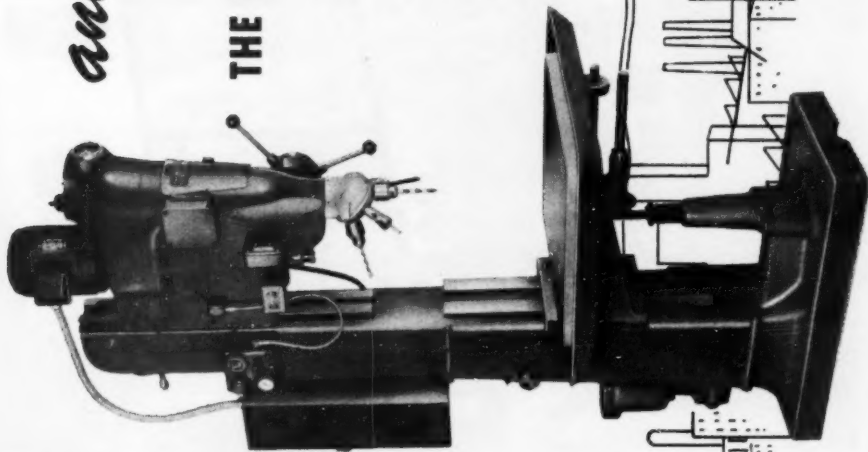
Available with the new T-J Super Cushion Flexible Seals which insure positive cushion with automatic valve action for fast return stroke. Many standard sizes and styles . . . for pushing, pulling, lifting, clamping or control jobs. T-J dependability. Write for bulletin 454. The Tomkins-Johnson Co., Jackson, Mich.

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to 3" bore in increments of
1" to 12" stroke.



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The HOWE & FANT Turret Drilling Machine is a revolutionary development that does for drilling what the modern turret lathe does for turning.

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29 Fitch Street, East Norwalk, Conn.

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JONES**

"Precision

give you a

New "TOOLITROL" speeds setup and tool changes!

New tool control method eliminates time-consuming tool adjustments in multiple-spindle machines, and obsoletes cut-and-try methods! You minimize downtime, keep machines operating at near capacity with "TOOLITROL." Co-ordinates at-the-machine problems of pre-setting, storing, and changing tools. Engineered to your job requirements. Sheet metal cabinets have pebble gray finish, are mounted on steel benches with hardwood tops. Tool panels are chrome plated, outlined with metal strips . . . red to indicate left-hand stations and blue for right-hand stations. Name plates identify tools for each station. Counters, with or without signal lights, control tool changes. Standard Flush Pin and Height Gages with Gage Plate speed presetting tools accurately to job requirements. Get Bulletin 19-50.



Holding" Tools

better, faster setup on every job!



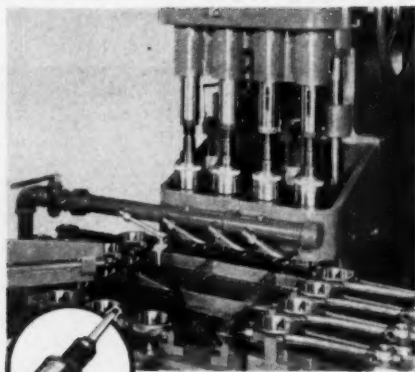
**New Safe-Torque Tap Driver
reduces tap breakage up to 100%**

At Caterpillar Tractor Co., Scully-Jones Safe-Torque Tap Drivers made possible 25% cost reduction, 10-12% manpower saving, 5% production increase, and 400% increase in tap life. You can save, too, by controlling adverse tapping conditions with this adjustable-torque driver. It releases completely when torque reaches danger point. Write for Bulletin 20-50.



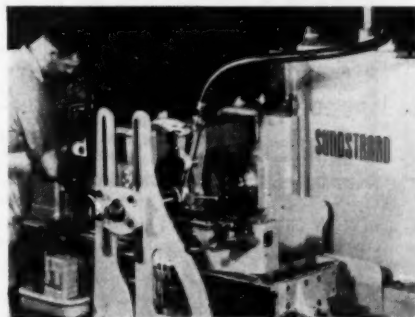
**Rugged Arbors assure long
tool life at high speeds!**

Rigidity of machine and tooling is a must for gang-milling these tough steel forgings... 46 per hour! Sundstrand specified Scully-Jones Style "B" Milling Arbors because they're tough and precision built to run true during fast, heavy cuts. Take the gamble out of milling with Scully-Jones Arbors and Adapters. Write for Bulletin 2-50.



**Chamfers rods on two sides
in one operation!**

At Studebaker Corp., Scully-Jones Automatic Recessing Tools prove their accuracy and speed. Each cycle they produce two chamfers in four connecting rod bores. The position of cutters for location and depth of cut is controlled within .001". Perhaps you have similar operations you can combine and simplify by using these Automatic Recessing Tools. Write for Bulletin 10-50.



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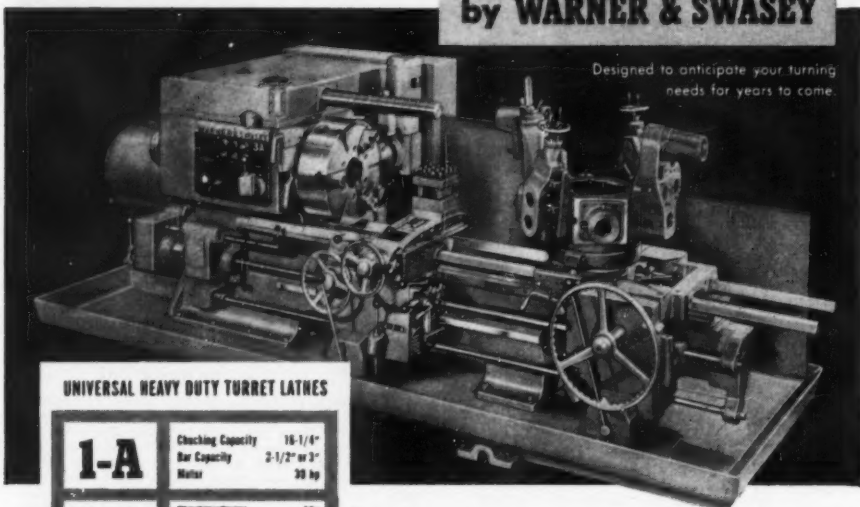
Call Scully-Jones local representative or distributor—factory-trained "Precision Tool and Work Holding Specialist"—for complete information and service.

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A whole new line of saddle type turret lathes...

by **WARNER & SWASEY**

Designed to anticipate your turning needs for years to come.



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1-A	Chuck Capacity 16-1/4" Bar Capacity 2-1/2" or 3" Motor 30 hp
2-A	Chuck Capacity 20" Bar Capacity 3-1/2" or 4-1/2" Motor 40 hp
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4-A	Chuck Capacity 26-1/4" Bar Capacity 6" or 12" Motor 75 hp

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PRECISION
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SINCE 1880

MORE POWER—increased up to 75 hp. in new 4-A! Gives you more than enough power for any job—faster removal of metal at all speeds!

MORE SPEEDS—16 speeds with smaller increments provide ideal speeds for *more* work diameters, increased production and tool life! 32 *un-duplicated* speeds with 2-speed motor!

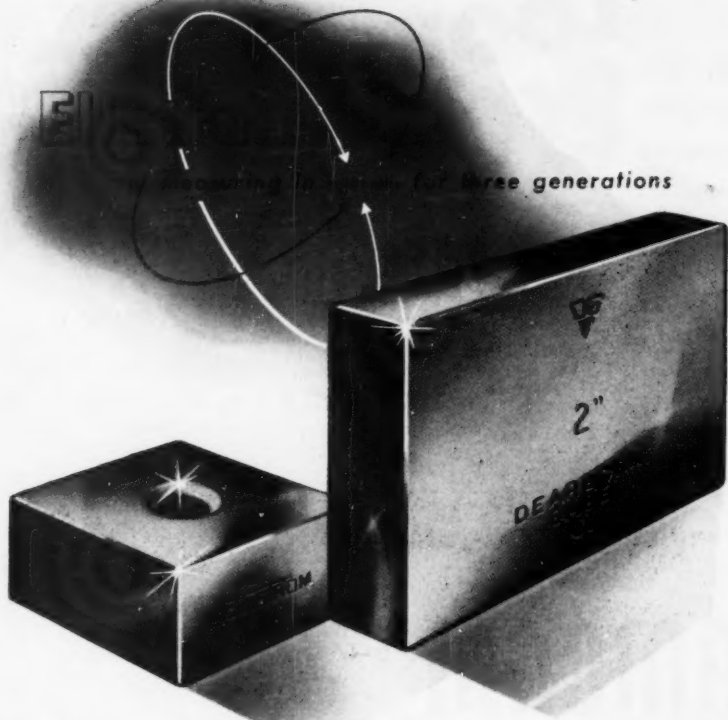
AUTOMATIC SPEED CHANGES—automatic hydraulic gear shifting in a matter of seconds on 2-A, 3-A and 4-A —boosts production, cuts operator fatigue! New 1-A's constant-mesh gear train with hydraulic clutches *eliminates* gear shifting completely!

SIMPLIFIED ZONE CONTROLS—eliminate waste motion and facilitate machine handling — increase operator efficiency! Single master control lever controls gear shifting, spindle stops, starts, and reverses!

IMPROVED ATTACHMENTS—Hydraulic chuck and bar feed with power return—for easier handling, less operator fatigue! New power chuck wrench eliminates backbreaking effort when chucking. Does not obstruct spindle bore!

RETAINS STANDARD WARNER & SWASEY TOOLING—all existing saddle type tools of the world's largest and most complete line can be used on these new turret lathes.

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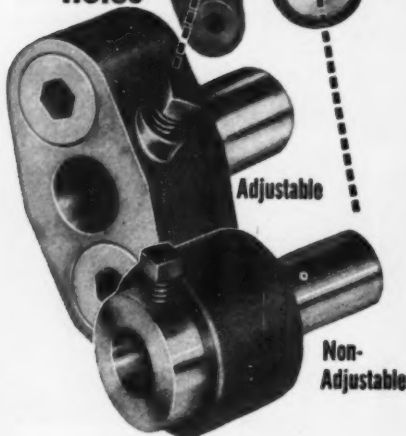
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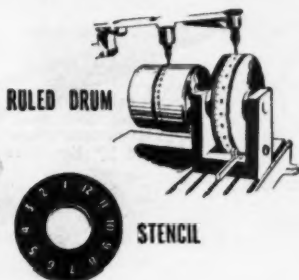


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Any Apex magnetic bit holder will accommodate a full range of Apex insert bits. All bits are easily and quickly interchanged in the holder, permitting a minimum bit inventory to cover most screwdriving requirements. Insert bits "float" slightly in the holder to provide easier alignment with screw recess and to reduce bit wear. Insert bits may be economically discarded when worn; bit holders last indefinitely.

Available for power, spiral and hand drivers



APEX Magnetic Hand Driver
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Combination Hand Screw Drivers,
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screwdriving and nut running!

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A permanent magnet in bit holders and sockets holds the screw or nut firmly in position. Bit holders have a bit retaining ring to keep the insert bit in place. This patented Apex construction prevents insert bits from pulling out of holder when in operation.

Apex offers the speed, economy, ease and convenience of a complete MAGNETIC operation for every production screwdriving and nut running application. Start *now* to reduce your driving and fastening costs by getting the facts about Apex MAGNETIC screwdriving and nut running.

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Available with broached openings from $\frac{1}{8}$ " to $\frac{3}{16}$ ", for driving sheet metal screws, hardened and commercial cap screws.

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CATALOG 21

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The PORTLAND milling head was especially designed and engineered to solve heavy duty milling problems . . . milling of armor plate, special alloys, etc. These heads are easily adapted to outmoded planers . . . converting them into powerful, modern, efficient planer-type milling machines.

SPECIFICATIONS

- Heads provided with 22 speeds in ranges up to 1000 RPM
- Infinitely variable Hydraulic feed from 0 to 60" per minute
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BOYAR-SCHULTZ 6x12

\$1380⁰⁰

LOW COST investment brings you the latest development in a 6 x 12 Surface Grinder.

ACCURACY SECOND TO NONE

— comparable to that of larger, more costly machines.

STURDINESS—maintains close tolerance precision over long production runs.

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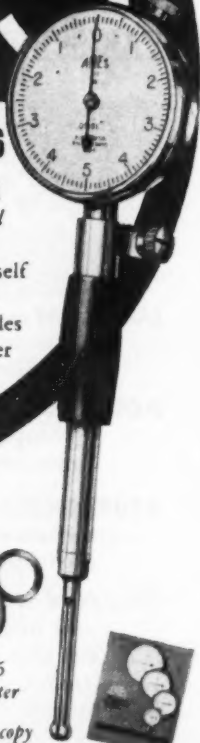
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Skilled and unskilled employees can use this superbly designed two-point contact gauge to make quick, accurate, *impersonal* inspections of small holes for size, taper and roundness.

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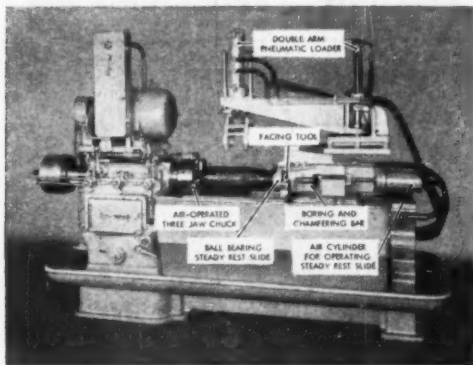
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MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



MODEL LR Lo-swing LATHE, BORES, FACES AND CHAMFERS OPEN END OF 155mm SHELL AT LOW COST

PROBLEM: To rough and finish bore, face and chamfer thread diameter of 155mm shells automatically.

SOLUTION: The Model LR Automatic Lo-swing Lathe selected for this job was equipped with a pneumatically-operated, three-jaw chuck for holding and driving the shells from the boat tail end. The opposite end is supported with a cone-shaped, ball-bearing rest mounted in a special heavy duty fixture which replaces the standard tailstock. The revolving rest is built into a sliding member which is operated by a large air cylinder, controlled by a hand valve. The construction of the revolving rest is shown in the line illustration.

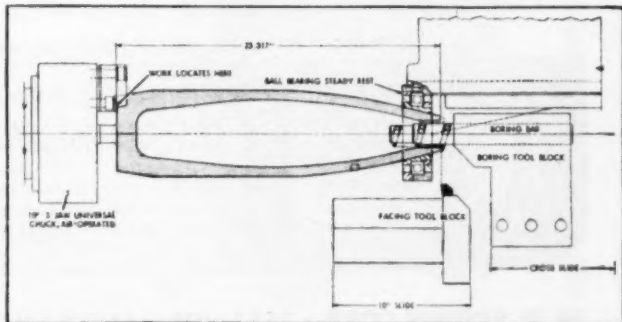
The lathe is equipped with two independently-operated front slides. The left hand slide carries a tool block and tool for facing

the open end of the shell to length and has a cross feed movement only. The right hand slide carries the combination rough and finish boring tools as well as the chamfer tool. This slide has both longitudinal and cross feed movements, providing tool relief on the return stroke of the boring bar. All tools operate simultaneously on a very fast machine cycle.

The problem of loading and unloading the heavy shells was solved with a double-arm, pneumatically-operated loader. A conveyor delivers rough shells to the rear of the machine. In position No. 1, one arm of the loader is directly above this conveyor and when lowered, picks up a rough shell while the other arm is clamped around the finished shell held between centers. The operator then moves a control lever which retracts the revolving rest and also opens the chuck jaws. The shell is pushed clear of the chuck jaws by means of a spring loaded plunger located in the headstock spindle. The operator now moves another control valve, which raises the loading device and swings it through 90 degrees to No. 2 position. This movement delivers the rough shell between centers and the finished shell to a second conveyor, located at the front of the machine, which leads to the next operation.

Seneca Falls engineers are at your disposal to help solve your turning and handling problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.



PRODUCTION COSTS ARE LOWER WITH Lo-swing

SPEEDY AIR VISE

SPEEDS UP

✓ MILLING

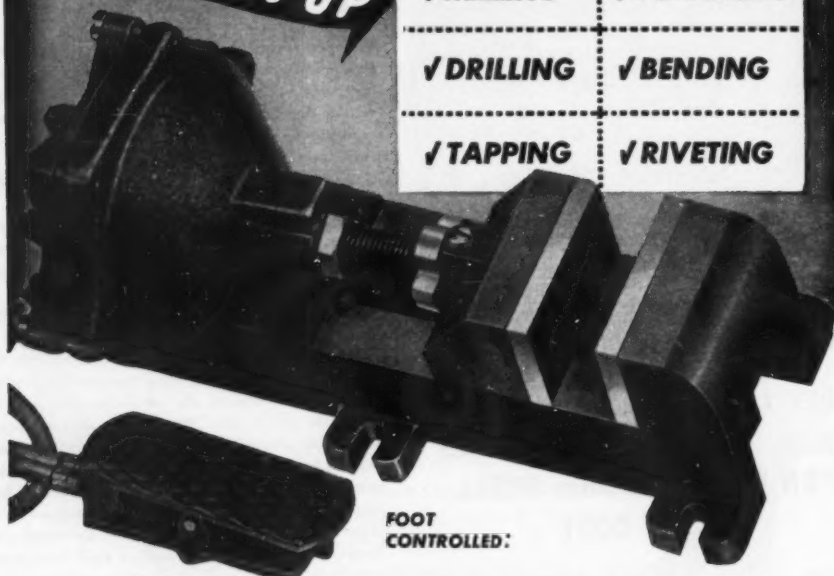
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Complete with Foot Control Valve, Air Hose and Fittings . . . only **\$36.00**

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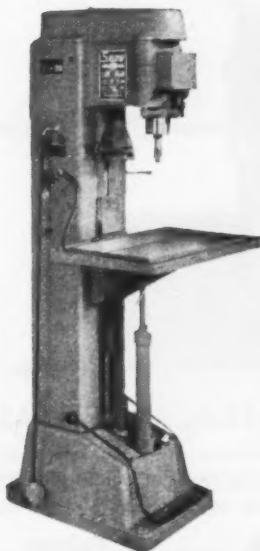
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AUTOMATIC and SEMI-AUTOMATIC JIGS and FIXTURES

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A complete line of basic Master Fixtures to permit adaptation of a wide range of parts at high production rate with low tooling cost.

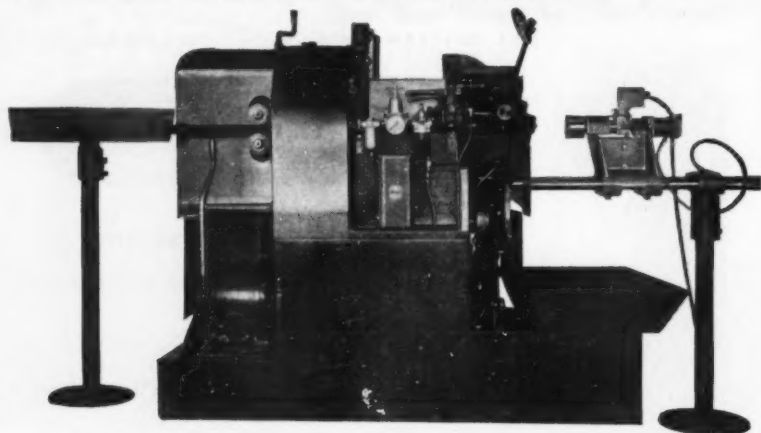


FULL AUTOMATIC

Nut Tapping Machines

Completely automatic hopper feed nut tapping machines up to $\frac{1}{2}$ "—incorporating simplicity and low tooling cost. Standard taps are used. Precision class 3 and 4 fits and parallelism maintained at high speed and high production.

The NEW MODERN AUTOMATIC CUTTING-OFF MACHINE



Cuts Off Tubing Pipe and Shafting . . . FAST

Cuts off longer pieces than a regular automatic machine. In fact, cuts off any length you want—and cuts it faster. If your production requires quantity cutting-off of tubing, pipe or shafting, check the figures below against your present time.

1/2" Tubing

This machine cuts off and chamfers both outside edges of 1/2" .030 wall tubing, 5" long at the rate of one every 2.5 seconds.

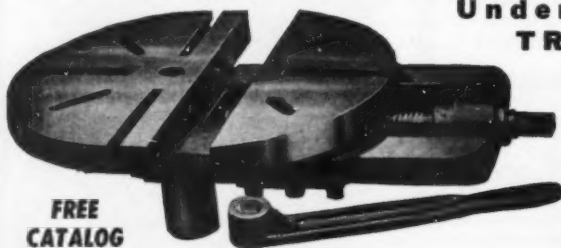
1 1/4" Cold Rolled

This machine cuts off and chamfers both ends of 1 1/4" cold rolled, 20" long, at the rate of one every 20 seconds.

1" Tubing

This machine cuts off and chamfers both outside edges of 1" long, at the rate of one every 3 seconds.

TRY THE MODERN SAFETY DRILL TABLE Under Our FREE TRIAL OFFER



**FREE
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Combines drill table, vise, parallels and V-block. Insures safer, faster work. We guarantee it will save its cost on labor alone in 6 months or your money back. Write for folder, with typical set-ups and specifications of all models.

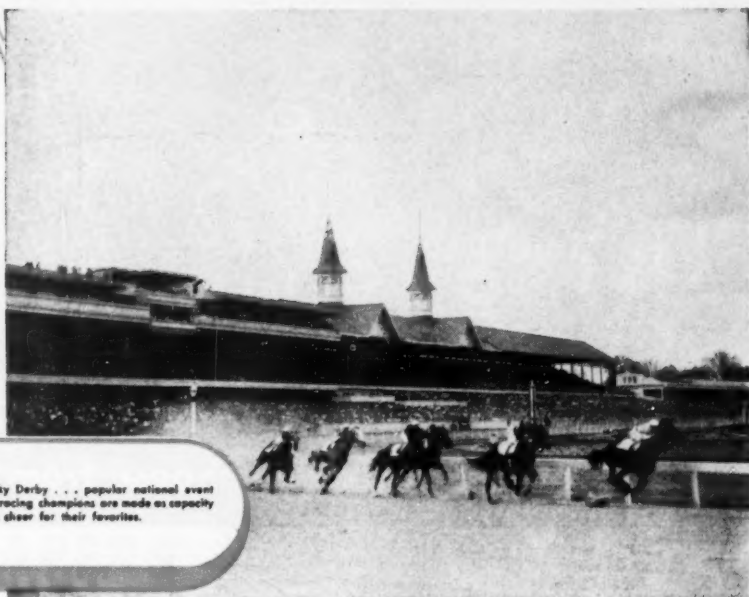
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Jackson, Michigan



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POWER MOVEMENTS IN ANY DIRECTION — NO POWER UNIT REQUIRED

COMBINES

the fast-acting, economical,
low pressure operation of

AIR

with the smooth, uniform
controlled regulation of

OIL

5

STANDARD
MOUNTING TYPES

Standard bores from 3" to 8".
Any stroke to 6 feet. For air
pressures to 150 p.s.i.

Furnished for controlled feed with rapid
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feed movement can also be provided.



Air-Draulic Cylinder
with Flange Mounting
at Rod End

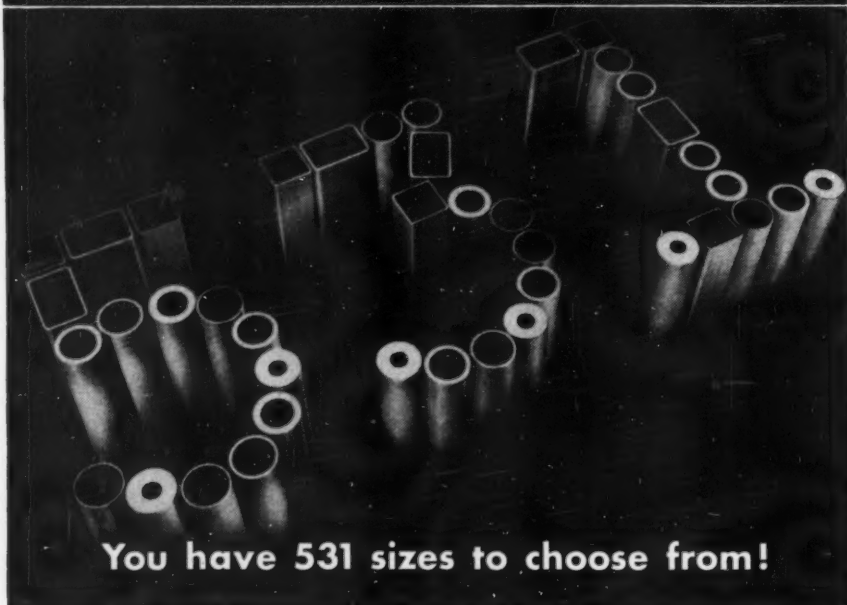
LOGAN MANUFACTURES 6,975 STANDARD CATALOGED ITEMS
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HYDRAULIC CYLINDERS, Cat. 200-2; 200-3 . HYDRAULIC POWER UNITS, Cat. 200-1 . SURE-FLOW COOLANT PUMPS, Cat. 62



LOGANSPORT MACHINE CO., INC., 863 CENTER AVE., LOGANSPORT, IND.

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You have 531 sizes to choose from!

WE carry no less than 531 sizes of Shelby Seamless Mechanical Tubing and can fill orders promptly . . . by the inch or by the carload. No matter what your tubing needs, we can supply you with the best for the job—tubing manufactured by the world's leading producer, National Tube Division of United States Steel.

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What you want
When you want it
At the right price



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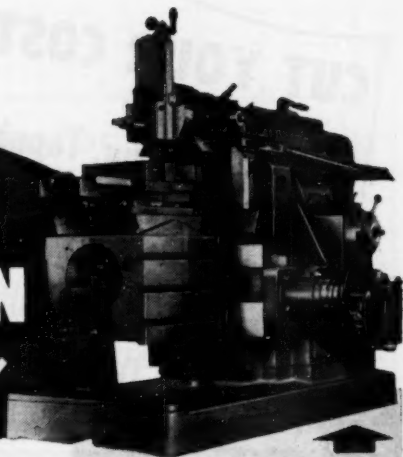
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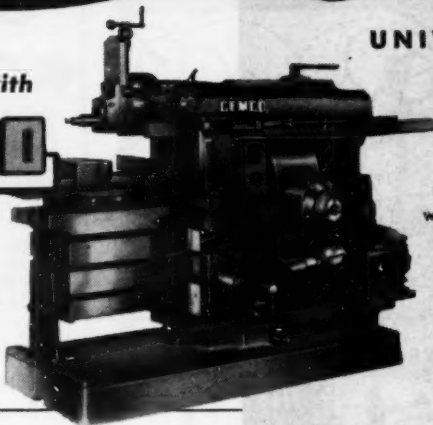


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For tool and die work and general machine shop work requiring frequent changes and angular settings. Available in sizes from 16" to 36" stroke.

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For general machine shop use and heavy production work. Available in sizes from 16" to 36" stroke.

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... available only in sizes 16" and 20" stroke



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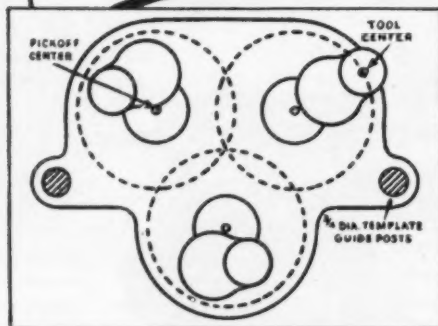
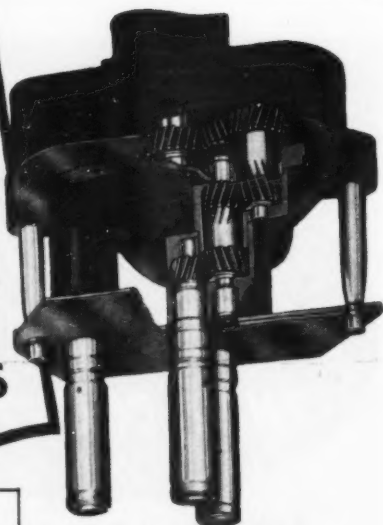
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PRECISION MACHINERY SINCE 1917

CUT YOUR COSTS
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**Multiple Drilling, Tapping,
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Use **WISCONSIN**
Kwick-Change Multiple
Adjustable DRILL HEADS

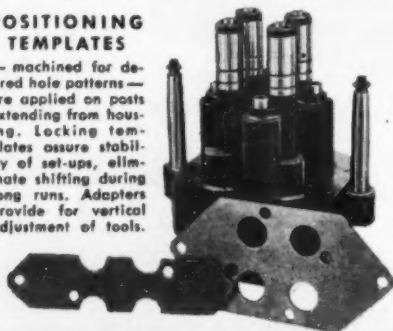


◀ ***This is Why!***

Only WISCONSIN Kwick-Change Multiple heads permit locating drill point anywhere within area of intersecting circles. There are no "blind spots" inside these circles. Spindle housings are sleeved with two centers of adjustment. Each spindle swings around one center which also may be rotated around another center. Diagram at left shows how this feature permits tool point to be located at any point within area of large circle.

**POSITIONING
TEMPLATES**

— machined for desired hole patterns — are applied on posts extending from housing. Locking templates assure stability of set-ups, eliminate shifting during long runs. Adapters provide for vertical adjustment of tools.



WISCONSIN Kwick-Change Multiple Adjustable Drill Heads are available with two to eight spindles, and in a complete range of capacities from "Light Duty" to "Extra Heavy Duty", in standard models. Heads with more than eight spindles built to special order. Positioning and Locking Templates are specially machined for as many hole patterns as required.

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WISCONSIN DRILL HEAD CO.

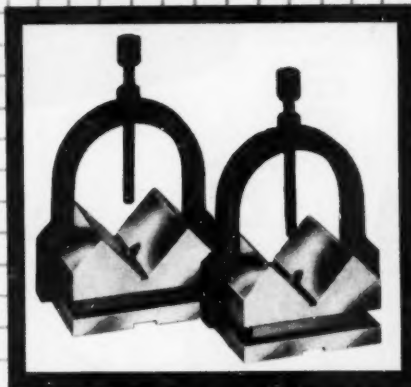
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ACCURATE TO WITHIN .0002" T.I.R.

Made of close grain, stabilized Chrome-Moly alloy to guarantee precision results every time. The exclusive new FROZONE process, for hardness and stability, makes *UNI-V-BLOCKS* the closest thing to absolute perfection, on the market today!



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($2\frac{1}{2} \times 3\frac{1}{4} \times 2\frac{1}{16}$ ")

UNI-V-BLOCKS are also
available as:

MODEL 5000 ($4\frac{3}{16} \times 5\frac{1}{8} \times 5\frac{3}{4}$ ")

MODEL 1250 ($1\frac{1}{4} \times 1\frac{1}{4} \times 1\frac{1}{2}$ ")

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Gentlemen Please send me complete data on
the new UNI-V-BLOCK, at no obligation to me.

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COMPANY _____

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INFORMATION!**

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...and **REX** is the standard
by which all high speed
steels are compared

No matter how keen the competition, there can be only one winner. And the difference between the winner and the runner-up, whether it's golf or making high speed steels, is measured in performance.

Crucible REX® high speed steels have proved their championship qualities under the toughest sort of competition — in actual use in thousands of tool shops throughout the world. But check for yourself. Try a piece of REX high speed steel on your next job. Compare its hardenability, response to heat treatment, its fine tool performance. You won't find another high speed steel to outperform REX.

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first name in special purpose steels

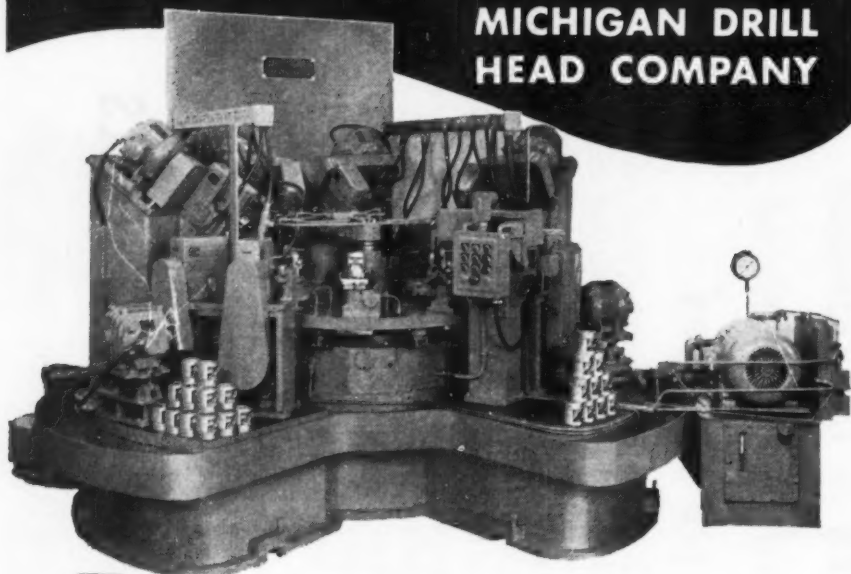
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TOOL STEELS

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.

Special Drilling Machine

DESIGNED AND BUILT BY THE
**MICHIGAN DRILL
HEAD COMPANY**



PICTURED is a 12-way, 6-station automatic drilling machine which drills 8 smoke holes and 4 oil holes in an automotive piston. This machine features a turn-around fixture and automatic ejection of the part. As the table indexes, the fixtures are hydraulically positioned to present the proper surfaces to the drills. In station number six, the parts are hydraulically ejected down a chute. The machine uses a standard Michigan 30" Hydraulic Index Table for indexing. This machine will produce 500 pieces per hour.

WE SOLICIT YOUR INQUIRY AS TO ANY SPECIAL DRILLING,
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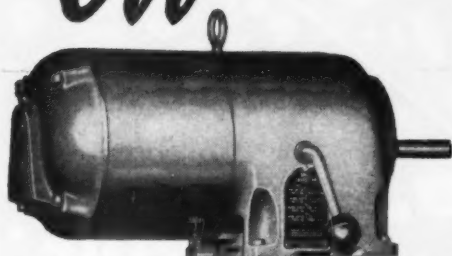
MICHIGAN DRILL HEAD CO.

971 E. EIGHT-MILE ROAD

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LIMA GEARSHIFT DRIVES

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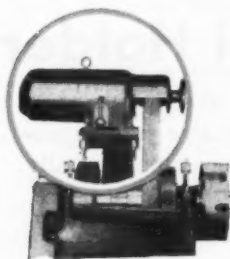
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If you want to *increase* production and *reduce* operating costs—eliminate obsolete overhead lineshafting!

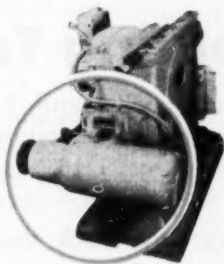
LIMA GEARSHIFT DRIVES have been designed to individually motorize all types of machine tools and production equipment — economically.

Why not let our experienced Sales Engineering Staff help solve your motorizing problems—an accurate survey of your requirements involves no obligation.

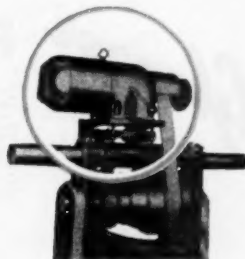
Write today for complete information.



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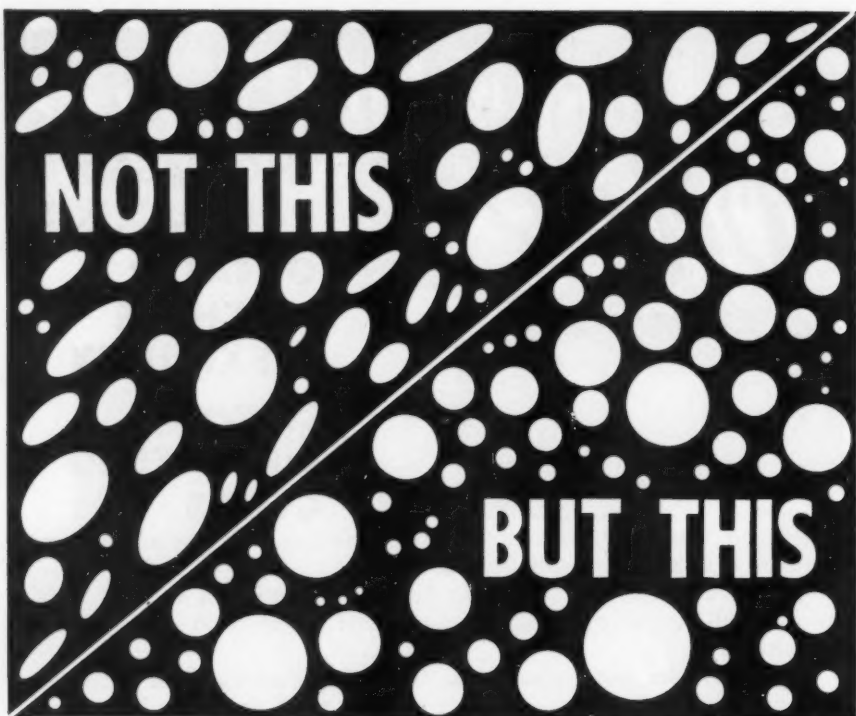
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Your choice of 26 types of

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Floating Tool Holders

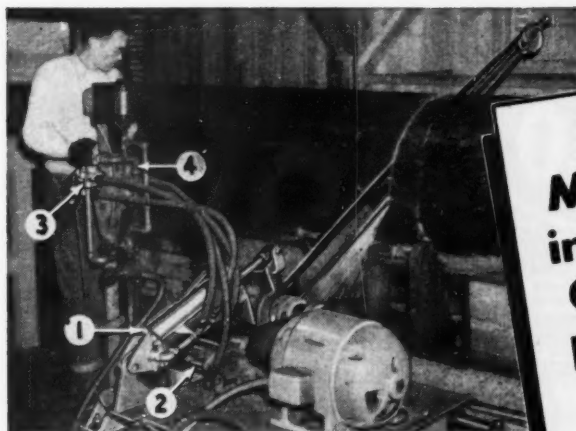
Eliminate bell-mouth holes even with worn machines. These Floating Holders correct misalignment of 1/16" diameter automatically. Save set-up time — reduce rejects.

***Utility
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**Try any stock item 30 days free!
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THE J. C. GLENZER CO. Inc.

1546 E. NINE MILE ROAD, DETROIT 20, MICH.



Arrow No. 1 — NOPAK 6"x14" Model E Cylinder
 Arrow No. 2 — NOPAK 4"x10" Model E Cylinder
 Arrow No. 3 and No. 4—NOPAK 1/2" 4-Way Valve

2 Vital Movements in Deck Saw Operations Powered by **NOPAK** Cylinders

This carriage-type deck saw, designed and built by Elk Lumber Co. Medford, Ore., eliminates mis-cutting, and short logs reaching the carriage.

The 8 foot chain-saw bar is raised and lowered by a NOPAK Model E, 6" x 14" Air Cylinder. Horizontal carriage movement of 10", powered by a NOPAK 4"x10" Air Cylinder, permits operator to locate saw accurately to cut logs within minimum tolerance of 1/2". Both movements are controlled by NOPAK valves mounted at operator's station.

This is typical of hundreds of machine movements in which NOPAK Cylinders and Valves are used in all types of industry. For others, see the NOPAK Application Manual.

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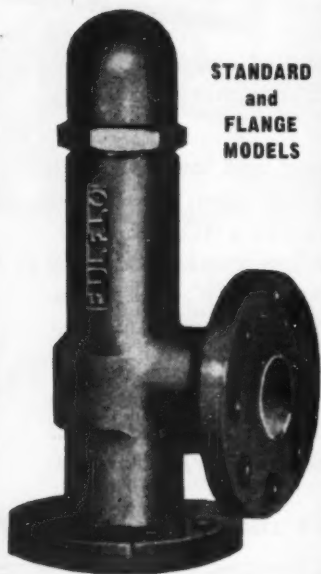
VALVES AND CYLINDERS

DESIGNED for AIR and HYDRAULIC SERVICE



VALVES

BY-PASS, OIL-RELIEF
PISTON TYPE,
HYDRAULIC



STANDARD
and
FLANGE
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PUMP AND VALVE MANUFACTURERS
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NON-CHATTERING

because the cylindrical piston closes off the port in a shearing manner . . . and does not seat abruptly against the body of the valve.

EXTREMELY SIMPLE

Just select pressure desired from 5 springs . . . INSTALL . . . NO FURTHER ATTENTION NEEDED.

For machine tool hydraulic mechanisms, oil-burning equipment, rams, presses and Diesel engines.

Pressures: 0 to 500 lbs.

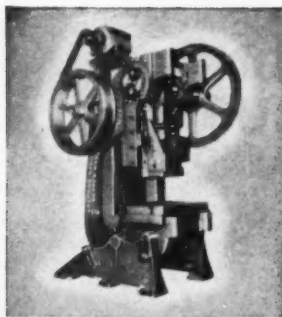
Pipe sizes: 1/4" to 2"

Bodies: cast iron or brass.

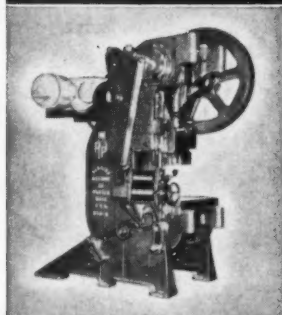
Pistons: brass, hardened or stainless steel.



WRITE—on your letterhead, please—for personal copy of **FULFLO MECHANICAL DATA BOOK.**
Specify if for Valves, for Pumps or for both.



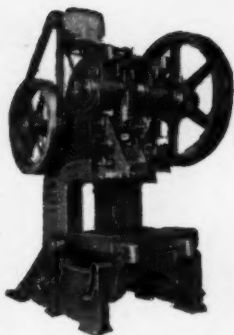
#700 B GEAR PRESS



650-B PLAIN FLY WHEEL

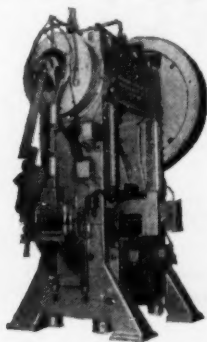


No. 10M FLYWHEEL PRESS



No. 800B GEARED INCLINABLE PRESS

Illustrating a few of the many types and sizes of standard Perkins Presses. Presses built to customers' special specifications.



**No. 12-H-36 STRAIGHT SIDE, SINGLE CRANK
TIE-ROD CONSTRUCTION PRESS
CAPACITY 200 TONS**



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WARREN, MASSACHUSETTS**

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SWIVEL BASE MILLING MACHINE VISES

STRONG ACCURATE LOW PRICED

Ideal for drill press and shaper work.

High-grade semi-steel castings. Hardened steel sliding jaws with full length bearing on a ground bar and machined ways. The $4\frac{1}{2}$ " and $6\frac{1}{2}$ " sizes have a large Acme steel screw with replaceable bronze nut. Four bolt and key slots for rigidly attaching to table so that work-holding surfaces are at true right angles or parallel to the table.

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Jaws: $6\frac{1}{2}$ " wide, 2" deep. Opens 4" with jaws, $5\frac{1}{4}$ " without. Wt. complete with crank, boxed, 85 lb.

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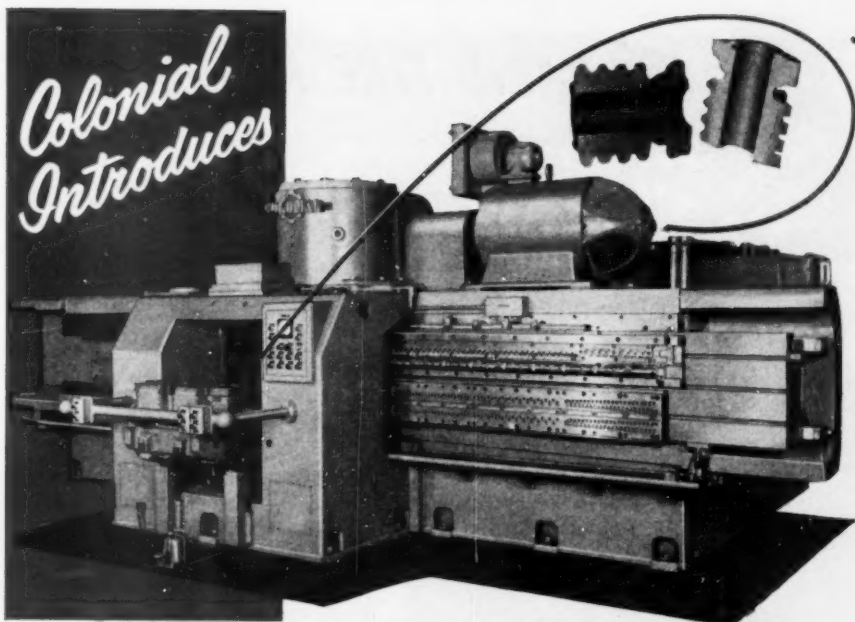
HUSKY \$24.00
Jaws: 3" wide, 1" deep. Opens 2" with jaws. Wt. complete with crank, 16 lb. Immediate Delivery. Order from Your Industrial Supply Distributor or Order Direct. Giving Name of Your Distributor.



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



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*Colonial
Introduces*

the **MECHANICAL HORIZONTAL**

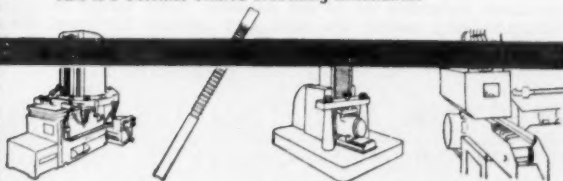
for faster
broaching
of surfaces

The model HM-25-130, is the first in a new line of Colonial **MECHANICAL HORIZONTALS**. It removes $3\frac{1}{2}$ pounds of metal, with depth of cut varying from $5/32$ to $3/16$ of an inch, in a 21-second broaching cycle from two cast iron bearing cap clusters. Tungsten carbide-tipped tool bits mounted on the 24" wide ram, travel at more than 140 feet per minute. The machine broaches on both the forward and return strokes, doubling the length of cutting action as compared to ordinary broaching. The machine has a 130-inch stroke and 25-ton capacity. Broaching speed is variable (30 to 150 sfm) through rheostat control of the direct current 150 hp motor.

Trunnion-type fixture has hydraulic clamping, positioning, and shuttling. All automatic cycle hydraulic and electrical controls are interlocked, and this equipment is installed according to J.I.C. standards. Table level loading of work and floor level accessibility of the broach inserts and practically all operating parts are important features of the machine. Floor space is 194 x 290 inches.

This is a Colonial Unified Broaching Installation.

Unified Broaching
COLONIAL





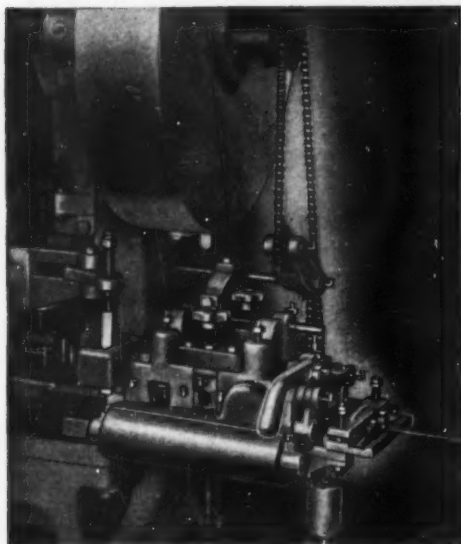
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Step up production by making your punch presses automatic! Wittek automatic roll feeds fit all makes and sizes of punch presses — provide maximum efficiency and extreme accuracy in the high-speed automatic feeding of strip stock. They are made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any of four directions. Length of feed is quickly and easily adjusted to meet individual job requirements.



4404

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Simplify Handling of Coiled Stock

A choice of standard models is available to facilitate handling a large variety of coiled stock... from small, light coils to those weighing up to 800 pounds. These larger reel stands automatically center the coils and provide frictional braking action to prevent overrunning and maintain uniform coil slack.

Write for full particulars

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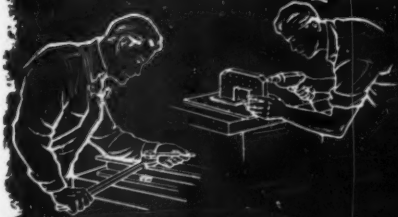
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ROLL FEEDS AND

REEL STANDS



VALUABLE EQUIPMENT IN ANY SHOP



HEAVY DUTY CHALLENGE WORK BENCHES



Challenge Work Bench
featuring tool box shelf
and steel drawer
with lock.



Challenge Work Bench
with tool box shelf.



Challenge Work Bench
without shelf or drawer.

Whatever your requirements may be — there is a Challenge work bench to meet your needs. Each has a durable cast-iron top two inches thick — will not warp, shrink, splinter or burn. And every one has leveling screws to insure a perfectly level and accurate surface. Legs are strong and solidly braced.

A COMPLETE RANGE OF SIZES AND STYLES

Three styles as shown . . . Four sizes: (top dimensions) 28x48 and 28x60 with four legs; 28x72 and 28x84 with six legs. Write for details and prices.

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LOWER THE
BOOM ON COSTS
**SET RIVETS
FAST**

2 at a time with the

Chicago
"214"

With every press on foot pedal Model 214 Chicago Double Rivet Setter automatically feeds, inserts and clinches *two* rivets. 14-inch throat accommodates large assemblies. Handles $\frac{9}{64}$ " diameter or smaller steel tubular rivets—lengths to $\frac{7}{8}$ ". Quick Change Rotary Type Hoppers and Raceways permit a 5-minute changeover to rivets of different size. Adjustable anvils and riveting centers add to versatility. For help with fastening problem...send sample assembly (or a blue print) for free fastening analysis.



FREE CATALOG contains valuable engineering information and rivet specifications plus illustrated descriptions of 26 Chicago Automatic Rivet Setters.

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SHAFT
MACHINES...**

**versatile
finishing
facilities—**

no costly fixed equipment!



You can grind, rotary file, wire brush, buff, polish and do many other preparation and finishing jobs with a single, portable machine when you install Strand Flexible Shaft Machines. Just change the tool to change the job. And changing tools is easy with Strand because the new Strand Quick Change Attachment eliminates threads, nuts, wrenches. Lock-button design does the trick—in seconds!

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Best of all—you are assured of better workmanship, higher output, less operator fatigue, because the operator lifts only the tool—not the heavy, bulky motor. And your Strand machine is portable—take it to any part of the plant where the work can be done best.

FREE CATALOG illustrates and describes all Strand units, including Strandflex machines, as well as conventional Direct Drive and Counter-shaft machines with up to 3 HP motors. See your Strand Distributor or write today for Catalog 231-A.



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1/4 H.P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.
High speed medium-light operation.
For bench, floor and pedestal mills.
Fits milling machines with overarm 1 1/2" to 3".
3/8" end mill capacity.

\$245.00



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1/2 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
3/4" end mill capacity.
For vertical, horizontal and angular operations.

1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
3/4" end mill capacity.
For vertical, horizontal and angular operations.

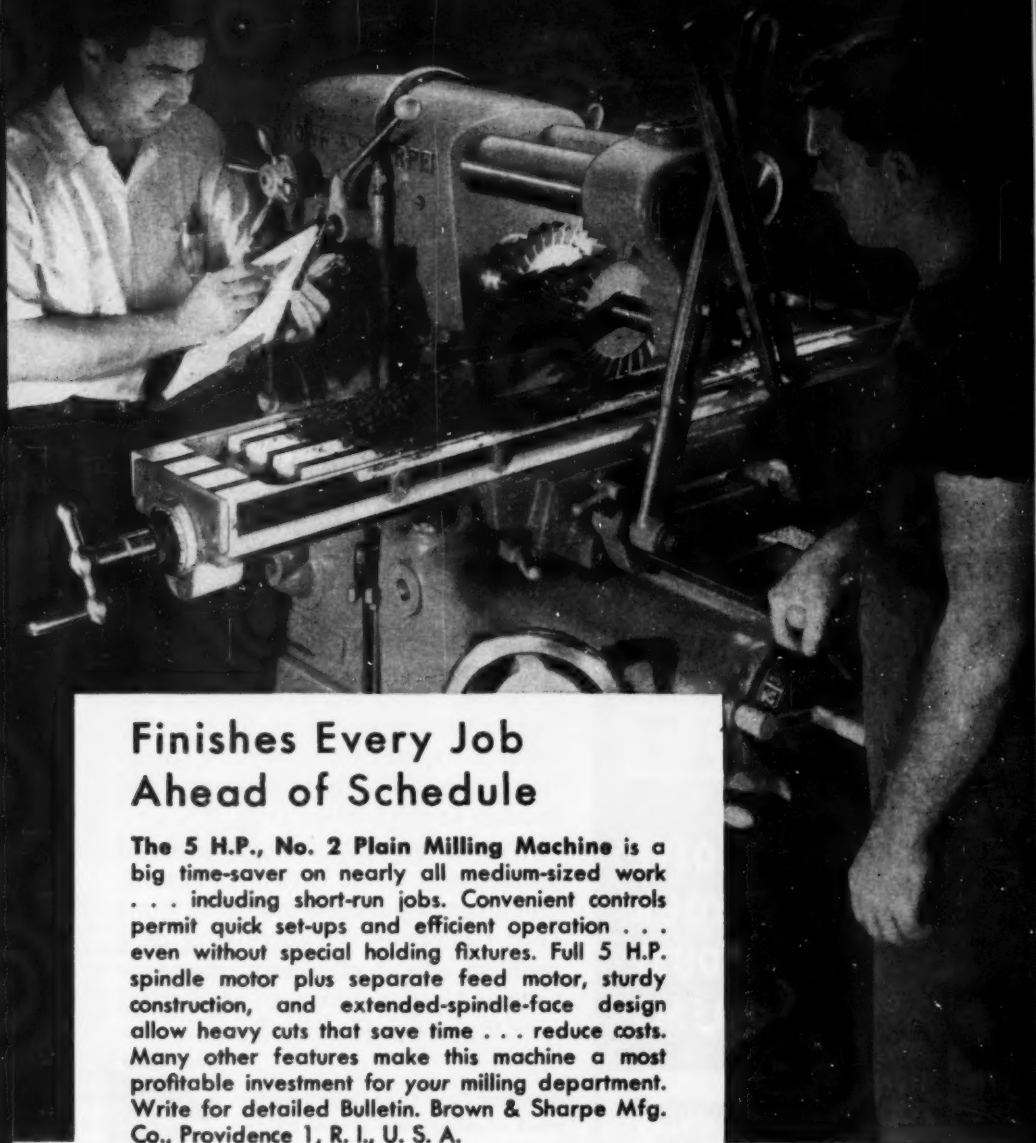
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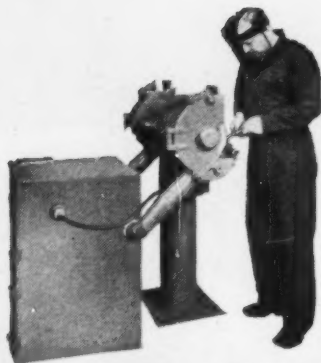


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The 5 H.P., No. 2 Plain Milling Machine is a big time-saver on nearly all medium-sized work . . . including short-run jobs. Convenient controls permit quick set-ups and efficient operation . . . even without special holding fixtures. Full 5 H.P. spindle motor plus separate feed motor, sturdy construction, and extended-spindle-face design allow heavy cuts that save time . . . reduce costs. Many other features make this machine a most profitable investment for your milling department. Write for detailed Bulletin. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

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**Complete
TO Shop
Installations**



TORIT

**WILL SOLVE
YOUR
DUST
PROBLEMS**

**TORIT Manufacturing Co.
303 WALNUT STREET
ST. PAUL 2, MINN.**

Industrial dusts are dangerous. They can damage precision machines or finished parts, create bad working conditions, reduce employee efficiency, and increase your insurance rates.

Whether it's just a single pedestal grinder or a whole battery of cut-off, grinding and polishing machines, Torit Dust Collectors will solve your dust problem—do it efficiently, economically and with a minimum of interference to your production layout.

Standard Torit Dust Collectors fit most situations and special adaptations can be quickly created, write for full information.

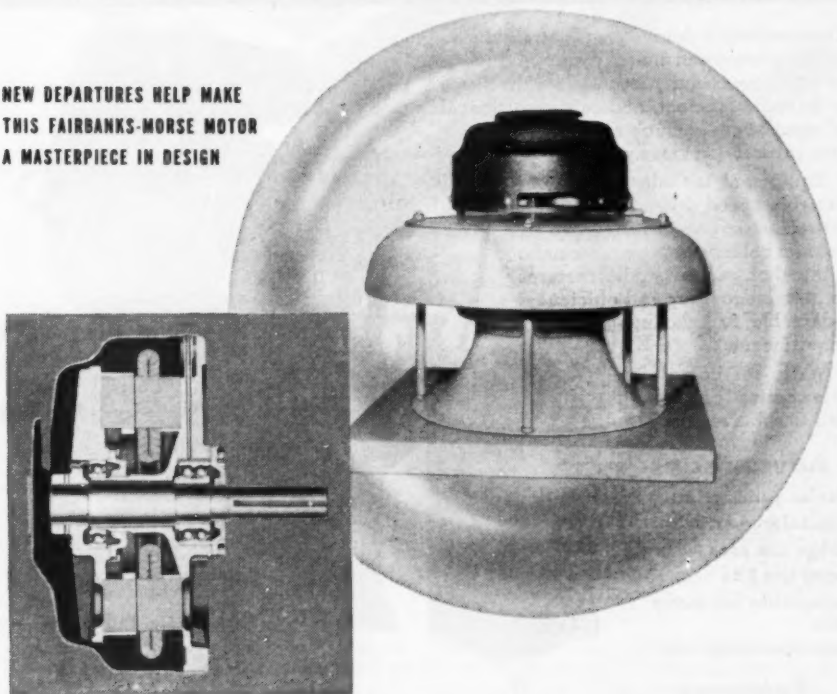
see our catalog in



BALL BEARINGS BEST...

... for Space-Saving, Streamlined Designs!

NEW DEPARTURES HELP MAKE
THIS FAIRBANKS-MORSE MOTOR
A MASTERPIECE IN DESIGN



New Departure's angular-contact, preloaded double-row **ball** bearing gives maximum resistance to deflection under *all* load conditions. In the Fairbanks-Morse axial air-gap motor, this bearing assures rigid, permanently accurate support for the rotor. The air gap is maintained with uniformity under *all* loads and mounting positions. Adjustments are never needed—and that means peak motor efficiency at *all* times.

Remember—New Departure is always ready to help with your bearing problems. Talk with your New Departure engineer *now*!



NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN. • Plants also in Meriden, Conn., and Sandusky, O.

L & J DOUBLE CRANK PRESSES

for High Speed Production

These versatile double crank, straight side punch presses can multiply your production of small precision parts. Proven by users to be more efficient, accurate, economical of manpower . . . much superior to any presses previously used.

Equipment includes air clutch; variable speed drive and controls; air-release spring-set brake; two air counter balances on ram; automatic lubrication and many other features to insure accuracy and efficiency. Adaptable to exacting requirements.

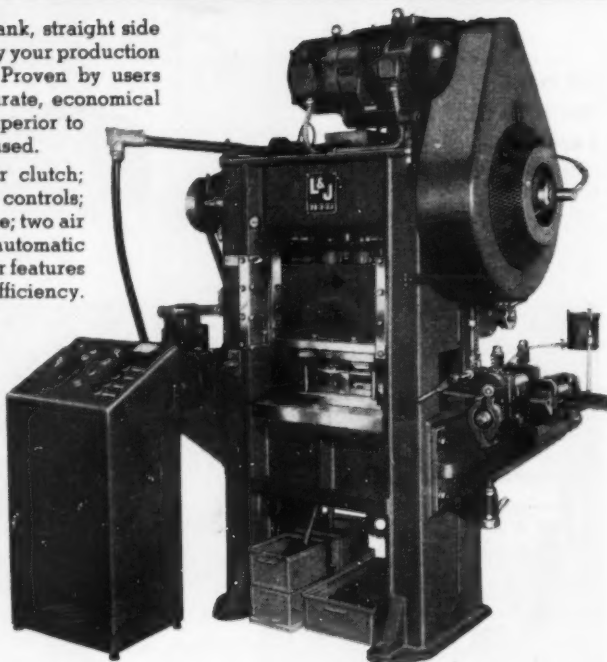
Write for complete information on these and O.B.I. Presses.

Advantages

Faster production
Precision parts
Large die area
Long die life
Adaptable for many jobs
Low operating cost

Features

High speed with accuracy
Box type ram
Adjustable square type hard bronze gibs
Box type, rigid, welded steel frame
Auxiliary equipment to suit the job



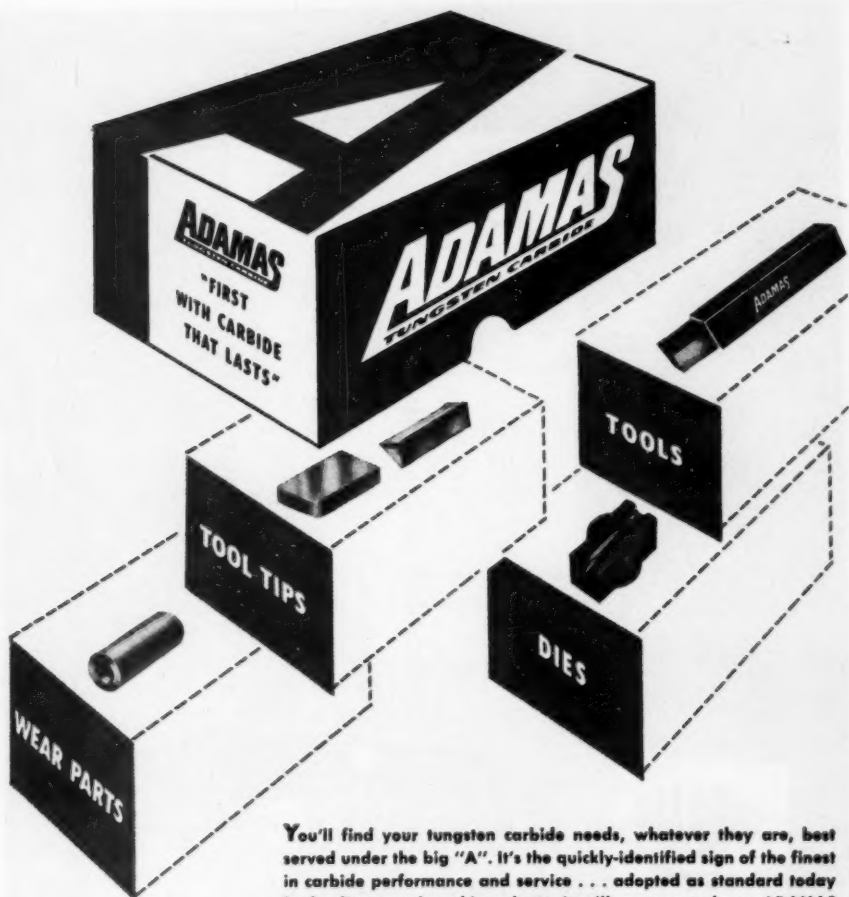
SPECIFICATIONS

	Model 20-2-24	Model 30-2-24
Capacity	20 tons	30 tons
Strokes per minute	150-450	150-450
Stroke length, standard	1"	1"
maximum to order	2"	2"
Ram adjustment (ratchet)	2"	2"
Ram area, L to R x F to B	24" x 12"	24" x 12"
Belstar area L to R x F to B	24" x 19"	24" x 19"
Die space, bed to ram (1" stroke down, adjust. up)	11"	11"
Weight, approx. pounds, as illustrated	6000	6500



L & J PRESS CORPORATION

1625 Sterling Avenue, Elkhart, Indiana



You'll find your tungsten carbide needs, whatever they are, best served under the big "A". It's the quickly-identified sign of the finest in carbide performance and service . . . adopted as standard today by leading metal working plants. It will pay you to know ADAMAS better, too . . . place your next order with ADAMAS and be convinced.

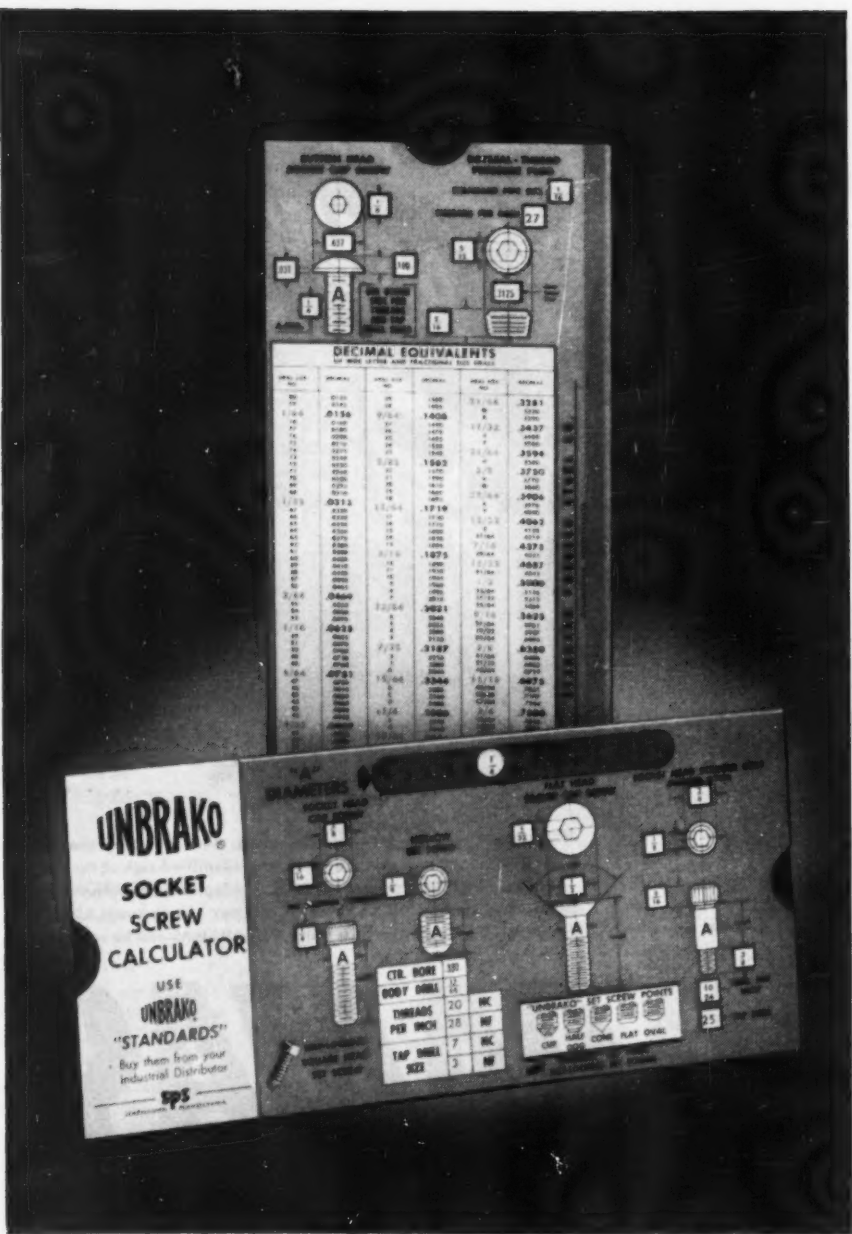
ADAMAS

TUNGSTEN CARBIDE

ADAMAS CARBIDE CORPORATION • KENILWORTH, NEW JERSEY

June, 1954

99



Our New UNBRAKO Socket Screw Calculator **YOURS FOR THE ASKING**

This handy pocket-sized slide-rule type socket screw calculator gives diameters, lengths, socket dimensions, threads and drill sizes—in fact, everything you want to know when using UNBRAKO socket screw products.

And it's free. Ask your UNBRAKO distributor or write STANDARD PRESSED STEEL Co., Jenkintown 52, Pa.

Standard UNBRAKOS are sold by leading industrial distributors everywhere.



SOCKET SCREW DIVISION

SPS

JENKINTOWN PENNSYLVANIA



Knurled Head
Cap Screws



Self-Locking
Set Screws



Flat Head
Cap Screws



Shoulder
Screws

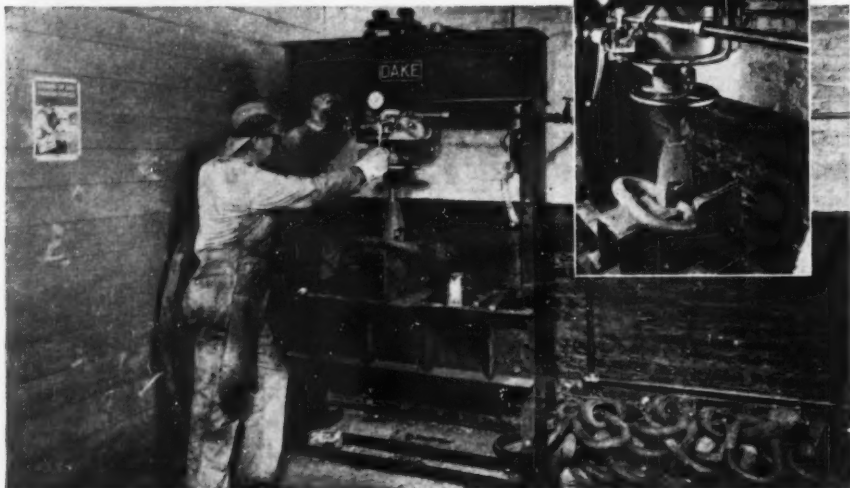


Dowel
Pins



Button Head
Socket Screws

A **DAKE PRESS** replaces the "hernia method" of driving plugs out of cable sockets



A concern that supplies cable slings for steel mills re-uses the closed-type sockets after driving out the cable-and-solder plugs.

Knocking them out was formerly a "brutal" job for two men. One held a driving pin, while the other swung powerful blows with a sledge. Working full time, they couldn't keep up with production requirements, and it was difficult to keep men for such hard manual labor.

Today, one man handles the entire job easily with a Dake Press, in 16 to 20 hours a week. Labor cost is less than 25%, and workers are mighty glad that the rugged hand sledging days are over.

Are you using Dake Presses for the hard jobs in your shop? Dake Catalog 129 shows many standard arbor and hydraulic presses . . . or, if you have a special problem, Dake can custom engineer a press to your particular needs. Why not ask?

Dake Engine Company, 608 Seventh St., Grand Haven, Mich.



Arbor Presses



Hand-Operated Hydraulic



Power-Operated Hydraulic



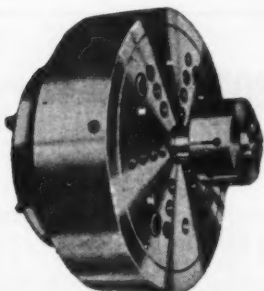
Geared Presses



Gas Type Presses



Portable Frame

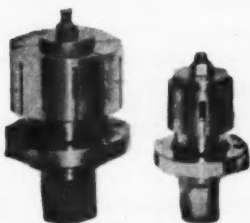
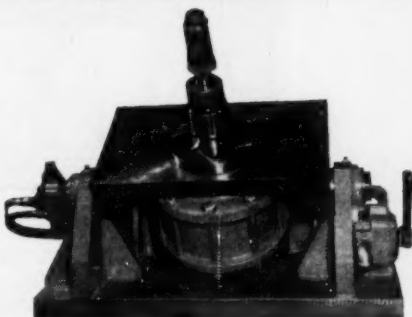


CHUCKS

Parts that can be chucked internally can be chucked faster and machined more accurately on SPEEDGRIP Precision Internal Chucks than by external chucking methods. Standard SPEEDGRIP CHUCKS are made in various sizes. They cover a range of bores from one half inch to eleven inches and can usually be purchased right from stock. SPEEDGRIP engineers are at your service to design and build any standard or special chucking equipment you may require.

FIXTURES

SPEEDGRIP fixtures are designed and built for use on single or multiple spindle boring machines; milling machines; drill presses, etc. At the right is shown a tilting type fixture that is used on a No. 150 Baker Drill. Two air cylinders are used for tilting and clamping the work. SPEEDGRIP fixtures hold work-parts securely, position them accurately and usually reduce loading and unloading time.



MANDRELS

All SPEEDGRIP Mandrels are made from high grade Alloy Steel, heat treated and ground to precision gages. Standard Mandrels are made in ten different nose sizes and use the same bushings as standard chucks. SPEEDGRIP engineers also design and build many special mandrels and welcome an opportunity to help solve your internal chucking problems where special equipment is required.

SPEEDGRIP CHUCK
820 NORTH WARD STREET
ELKHART, INDIANA

The last tenth is the troublesome one —

~~.0003~~

~~.0002~~

.0001



can get it for you

because ARTER has it

Rotary Surface Grinders

Cylindrical Grinders

Internal Grinders

Carbide Tool Grinders

Tell our engineers your grinding troubles—

They are real troubleshooters.

ARTER GRINDING MACHINE COMPANY
WORCESTER • MASSACHUSETTS

Agents in principal industrial centers of United States and Canada

TOOL LIFE UP 75%

DOWN-TIME DOWN 43%

PRODUCTION UP 45%

**USING
SHEAR-SPEED
SOLUBLE OIL**

on multiple "single-point" form cutting operation in the plant of a large auto manufacturer. IMPARTIAL PRODUCTION TESTS of previous "best" cutting fluid vs. SHEAR-SPEED Soluble Oil were run under *exactly* similar conditions—same machine, same parts, same tool grinding, same coolant flow.



JOB SPECS:

24-tooth transmission gears, 2.5" pitch dia., 1.185" face width, cut two at a time on gear shaper from SAE bar steel, 207-228 BHN.

**ACTUAL TEST
DATA
(averaged)**

**Previous Best
Cutting Fluid**

**SHEAR-SPEED
Soluble Oil**

OVERALL
TOOL LIFE

DOWN-TIME
PER PART

PARTS PER HR.
(INC. DOWN-TIME, ETC.)

CYCLE TIME*
(FLOOR-TO-FLOOR)

15,200 parts
26,600 parts

.0625 min.
.0357 min.

86
125

55 sec.
35 sec.

75% improvement

43% improvement

45% improvement

36% improvement

*Tool life increased despite higher cutting speed.

A few select sales areas still available.

Convince yourself of the amazing advantages and versatility of SHEAR-SPEED Soluble Oil in your own plant. Sold only on a satisfaction guaranteed test basis. Write for Bulletin SO-53 and price list.

SHEAR-SPEED
CHEMICAL PRODUCTS

7125 E. McNICHOLS RD. A Division of Michigan Tool Co. DETROIT 12, MICH.

MILLING MACHINE ARBORS, ADAPTERS, ARBOR SPACERS AND BEARINGS

Standard American
Dimensions

Tested for
Performance

Immediate delivery from
New York Stock

MADE IN GERMANY

Low Competitive Prices

Hardened and ground to high standards of
accuracy and quality by long established, rep-
utable, West German Manufacturer.

ADAPTER FOR
TAPER SHANK TOOLS



- Multi Purpose Vises
- Tapping Attachments
- Quick Change Chucks
& Collets
- Wille-Grip Keyless
Drill Chucks
- Lathe Mandrels

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available.)

Also United States
Distributors of European
Machine Tools

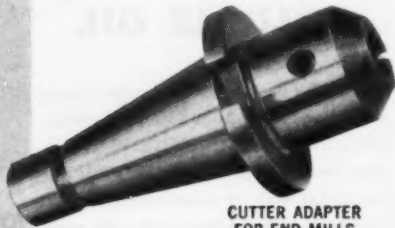
STYLE "B" ARBOR



STYLE "C" ARBOR



CUTTER ADAPTER
FOR END MILLS



Our headquarters
in New York City

Write for complete details and prices to Dept. 22

M.B.I. EXPORT & IMPORT LTD.
475 Grand Concourse, Bronx 51, N.Y.

"Over 20 years experience in designing & building machinery"

CABLE ADDRESS: Machbuild New York

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*Almost every new twist
drill that comes into
your shop has been ground
on a Sellers Drill Grinder!*

The
**SELLERS 6-G
DRILL GRINDER**
5/16" to 3" Capacity



**CONSOLIDATED
MACHINE TOOL CORPORATION**

WHOLLY OWNED SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED

ROCHESTER, NEW YORK

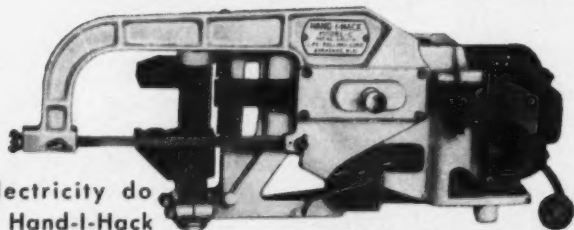
Goodbye Elbow Grease!

Use

HAND-I-HACK*

Portable

POWER HACK SAW



TAKE IT EASY—let electricity do your muscle work! Hand-I-Hack eliminates the sweat and fatigue of hack sawing. Plugs into any wall or light socket. Truly portable — can be carried anywhere with one hand. Has swivel vise — operates in any position: horizontally, vertically, at an angle, even upside down. Maximum capacity: 3" x 3" square cut. Uses lower cost standard 10" hand blades — will cut solid bar stock and thin wall tubing, pipe, conduit, cable, rolled forms, etc.



Cutting small diameter brass tubing, using wood block false jaws.



Making a square cut on solid 3" steel bar.

• Write for catalog and name of dealer



*T.M. Reg. U.S. Pat. Off.

Lipe - ROLLWAY CORPORATION

Manufacturers of Automotive Clutches and Machine Tools

814 Emerson Ave., Syracuse 1, N. Y.

WHY IT PAYS TO BUY STAINLESS BARS FROM US



You get design assistance, too!

ONE of our experienced stainless men will be glad to work with you on stainless steel selection problems so that you can use the most effective and economical grades and sizes. And we follow through from design to delivery to make sure that you get exactly the steel specified for the job. With complete stocks of dependable USS Stainless Steels, fast delivery service, and competent, thorough technical assistance, we offer a real cost-cutting combination.

Whatever your demands, it'll pay you to call on U. S. Steel Supply the next time you need stainless steel. Our complete stocks of USS Stainless include bars—rounds, squares, hexagons, angles, channels and the widest selection of grades, sizes and finishes of sheets and strip available.

U. S. STEEL SUPPLY DIVISION

General Offices: 208 So. La Salle St., Chicago 4, Ill.
Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL

TRIPLE SECURITY

What you want
When you want it
At the right price

SEND FOR FREE LITERATURE



U. S. Steel Supply
208 So. La Salle St., Chicago 4, Ill.

Gentlemen:

Please send me, without obligation, literature on your Stainless Steel stocks and service.

Name.....*

Company.....

Address.....

City.....State.....

*versatility
accuracy
economy*

another great new PLUS... The CLAUSING VERTICAL MILLER

is NOW READY FOR YOU!

The new Clausing Vertical Milling Machine has more Plus Value features than have ever before been available in a miller at or near its price!

It has Versatility Plus! It is actually several machines combined in one. The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to mill, drill, bore, ream and shape at all angles, with one setup.

It has Accuracy Plus! The heart of the Clausing Mill is its rigid, high precision spindle head. It has 7 ball bearings—spindle is chrome nickel steel, hardened and ground—quill, hardened and ground, has honed bearing seats—overarm is rigid steel casting with $\frac{3}{4}$ " thick walls precision ground. All feed screws have ground threads, turn on ball bearings. Table surfaces and dovetail ways on table, saddle, knee and column are precision ground.

It has Economy Plus! The Clausing reduces setup and operating costs. It's low in initial investment, low in upkeep costs.

Write today for the complete story!

CONDENSED SPECIFICATIONS

Size of Table.....	6" x 24"
Longitudinal Table Travel.....	15"
Transverse Table Travel.....	5"
Vertical Table of Knee.....	12"
Maximum Distance Spindle to Table.....	12"
Maximum Distance Spindle to Column.....	8 $\frac{3}{4}$ "
Quill Travel.....	3"
Spindle Speeds: Six, 180 to 3250 R.P.M.	
No. 7 Brown and Sharpe or No. 2 Morse Taper Spindle Optional.	
Operates from $\frac{1}{2}$ or $\frac{3}{4}$ HP, 1725 R.P.M. Motor	

MILLS, DRILLS, BORES, REAMS AND SHAPES . . .
AT ALL ANGLES . . . WITH ONE WORK SETUP!

CLAUSING DIVISION, Atlas Press Company
6-107 NORTH PITCHER STREET, KALAMAZOO, MICHIGAN



For greater
ACCURACY, RANGE, SPEED
in grinding perforators!



Harig *Grind-All* Fixture

Easier movement now possible with new pre-loaded ball bearing type of construction.

A few examples of perforator shapes that can be made faster and easier with Grind-All.



Patent No.
2449459

With the Harig Grind-All fixture, you make perforator grinding setups **THREE TIMES FASTER** — grind a variety of regular and irregular contours with the greatest possible accuracy and widest operating range. Exclusive radius generating feature makes fixture particularly adaptable to carbide grinding.



For details on service and facilities, send for the fully illustrated Harig Catalog.

Harig

1000 W. Howard St., Chicago 21, Ill.

SANFORD BENCH SURFACE GRINDER MODEL SG

for Wet* or Dry Grinding!

PRECISION • SPEED • SENSITIVITY

A low cost, precision machine for surface grinding dies, instrument parts, gauges and other small parts which would fit in the palm of the hand.

By using Sanford Bench Grinders many manufacturers of precision machinery have drastically cut over-all costs for finishing small intricate parts. This releases large, more expensive machines for heavier duty work.

The Sanford SG is the only low cost Bench Surface Grinder that

- Grinds to less than .0001" tolerances
- Operates without vibration
- Assures long life because Meehanite castings are used in its construction

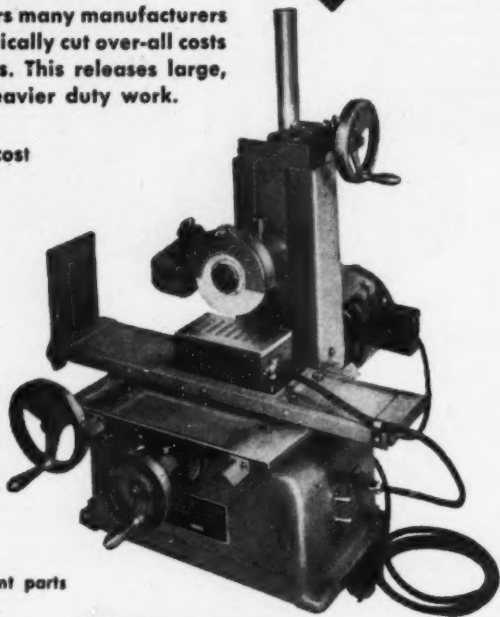
SPECIFICATIONS—4" traverse
—8" longitudinal—6" vertical
under 4" wheel. Approximate
weight 160 lbs.

Complete details are included
in illustrated bulletin.

Send for your copy today.

Reconditioning facilities, replacement parts
and special attachments are available.

Send for price list.



*With optional equipment

SANFORD MANUFACTURING CORP.
1026 Commerce Ave., Union, N. J.

National Tool Co.



Years of successful experience in special tooling and related production problems are yours for the asking. When the job requires special cutting tools, call in your National Tool Co. representative. He is backed by more than 49 years experience in the engineering and manufacture of special cutting tools. His assistance is yours, without obligation, whether you're interested in one tool or a complete tooling program.

National
TOOL CO.
Cleveland 2, Ohio

ARM TOOLS • COUNTERBORES • SLITTING SAWS • ROLLER AND SILENT CHAIN SPROCKET
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 SPECIAL SLENDER AND STEP DRILLS • WORM GENERATING CUTTER
 ROLLS • INVOLUTE GEAR AND SPLINE CUTTERS • SPECIAL SOLID TUNGSTEN CARBIDE TIPPED

JOHNSON BAND SAWS



BOTH WET AND DRY MODELS

Capacity—10" rounds, 18" flats
Motor— $\frac{1}{2}$ H.P. Ball Bearing any voltage
available, single or polyphase ($\frac{3}{4}$ H.P.
on wet machine).
Wheel Diameters—16".
Floor Space—66" x 31".
Bed—11" wide, 44" long, 6" deep, 24" high.
Overall Height (Closed)—39".

SPECIFICATIONS—MODEL J

Blade Length—11'5" x $\frac{3}{4}$ " x .032" All
Standard blades of these specifications
can be used.

Weight—Approximately 750 lbs. Crated
800 lbs. Boxed for export 875 lbs.

Speeds—35, 90, 130, 190 feet per
minute.

Casters—Optional at slight extra cost.

MODEL B, 5" x 10" CAPACITY ALSO AVAILABLE

WRITE FOR DETAILS

JOHNSON MANUFACTURING CORP.

ALBION, MICHIGAN

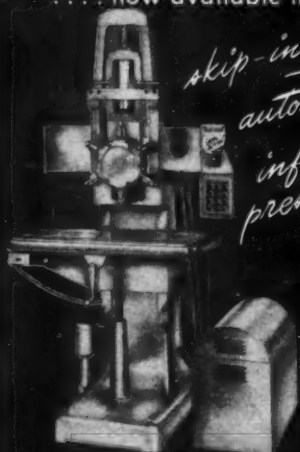
INCREASE PRODUCTION

CUT COSTS

IMPROVE QUALITY

...with
Burgmaster
 TURRET DRILLS
 ... now available in 3 models

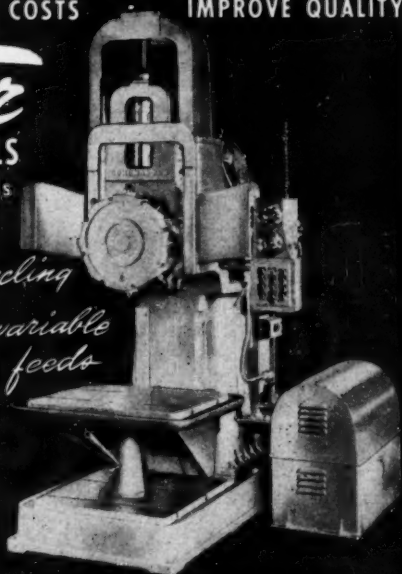
*skip-indexing
 automatic cycling
 infinitely variable
 preselective feeds*



6 SPINDLE MODEL 2BH
 AUTOMATIC • HYDRAULIC



6 SPINDLE MODEL 2A
 MANUAL



8 SPINDLE MODEL 3BH
 AUTOMATIC • HYDRAULIC

SPECIFICATIONS:

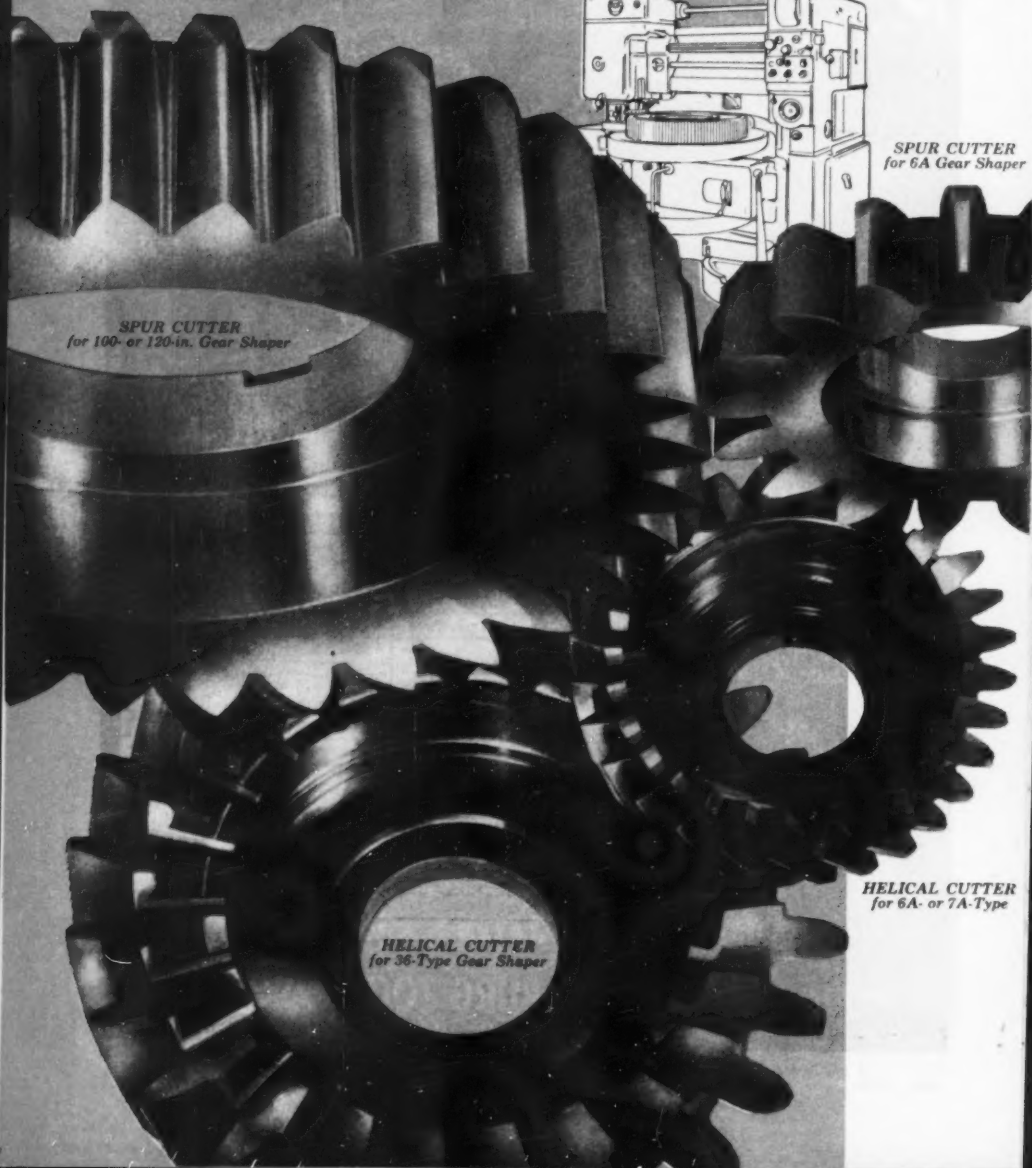
	MODEL 3BH	MODEL 2BH	MODEL 2A
Drill capacity, mild steel	1 1/4"	3/4"	3/4"
Ram travel	12"	8"	8"
Spindle speeds, preselective	12	12	12
Speed range	115-1700	225-3000	225-3000
Depth control	Preselective	Preselective	Preselective
Throat depth	19 1/2"	12"	12"
Table work surface	25" x 35"	17" x 34"	17" x 34"
Table travel	19"	19"	19"
Max. clearance, spindle to table	32"	23"	23"
Max. diameter tool clearance	9"	4 1/2"	4 1/2"
Motor, 2-speed, 1800/900	10/5 H.P.	2/1 H.P.	2/1 H.P.
Weight, approximate	7000 lbs.	2500 lbs.	1800 lbs.
Height	120"	78"	72"
Floor space, approximate	6'6" x 5'4"	6'0" x 5'1"	3'8" x 5'1"

B

WRITE TODAY FOR DETAILED INFORMATION

BURG TOOL MFG. CO. Dept. BB-6

THE *Fellows* LINE OF



SPUR CUTTER
for 6A Gear Shaper

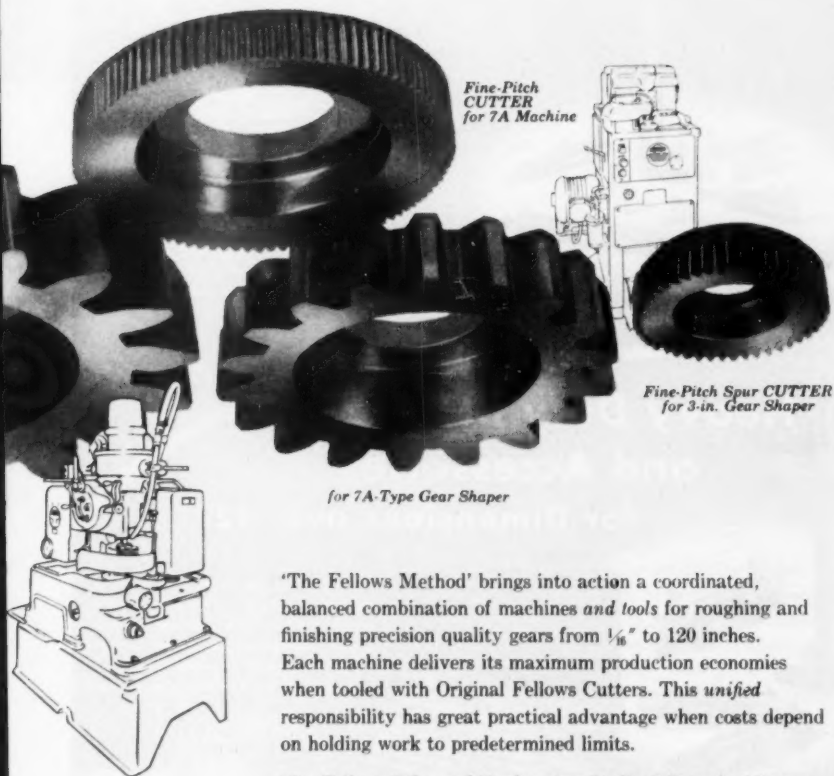
SPUR CUTTER
for 100- or 120-in. Gear Shaper

HELICAL CUTTER
for 36-Type Gear Shaper

HELICAL CUTTER
for 6A- or 7A-Type

MACHINES AND TOOLS

delivers Quality Control in All Sizes...



'The Fellows Method' brings into action a coordinated, balanced combination of machines and tools for roughing and finishing precision quality gears from $\frac{1}{16}$ " to 120 inches. Each machine delivers its maximum production economies when tooled with Original Fellows Cutters. This unified responsibility has great practical advantage when costs depend on holding work to predetermined limits.

The Fellows Sales and Engineering Staffs at Branch Offices and at Headquarters are men of broad experience and practical skill in helping customers combine specified accuracy with close control of costs. All Fellows Offices are at your service.

THE FELLOWS GEAR SHAPER COMPANY

Head Office & Export Department: 78 River Street, Springfield, Vermont

Branch Offices: 319 Fisher Building, Detroit 2, Michigan • 5835 West North Avenue, Chicago 39, Illinois
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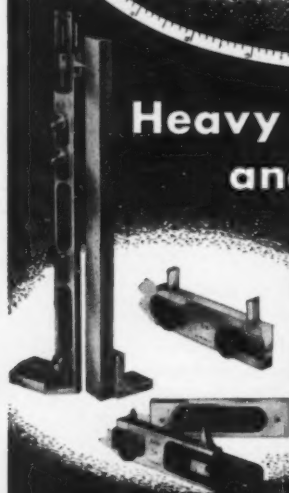
Standard Webber Accessories for Dimensions under 12"



WEBBER Standard Accessories are designed for use with standard Webber Gage Blocks and are recommended for measurement under 12". Gage block holders, jaws, center point, scriber and base can be combined into a variety of small gages for precision layout and inspection.



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No workpiece too large, infinite range. Patented clamps, jaws, center point, scriber and base offer wide gaging application. Patented eccentric clamp squeezes blocks in opposite directions thus maintaining $\pm .000005"$ over entire buildup.



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GAGE BLOCKS
and ACCESSORIES

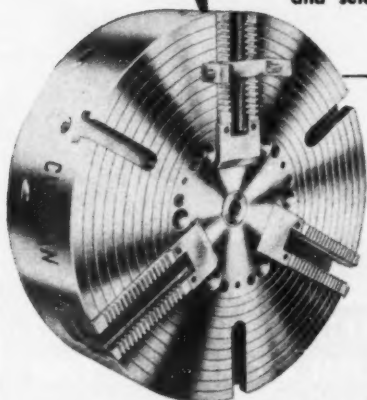
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Largest exclusive manufacturer of
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CHUCK-ABILITY: The ability to **SPEED** your work
... **ELIMINATE** fatigue ... **IMPROVE** your products
... and **REDUCE** your costs ... through design
and selection of the right work-holding devices



Remember-

You can't machine it economically
unless you hold it right

an example

... is the Cushman Accralock® Angular Serrated Jaw Adjustable Chuck, especially recommended for production and special chucking operations where small, accurate jaw adjustments are necessary. Top jaw settings can be made to tolerances as close as .001" and, after locking, provide the rigidity of a one-piece jaw plus elimination of any unintended jaw movement. Accralock® Air Operated Chucks are available from 8" to 24" with either 2 or 3-jaws. Also available is a 4-jaw chuck of the 2-3 jaw type which combines the advantages of either 2-jaw or 3-jaw chucking in one chuck body. Sizes are from 15" to 24"

Find out what Chuck-Ability can do for you ... write Cushman for Catalog PO-64-1953 fully describing Cushman Air Operated Chucks, Cylinders and Accessory Equipment ... or, should you have a special work-holding problem, consult the Cushman Engineering Dept.

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806 Windsor Street

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Manufacturers of

A WORLD STANDARD FOR PRECISION

Air Operated Chucks, Cylinders, and Accessory
Equipment ... The Cushman Power Wrench ...
Cushman Manually Operated Chucks and Face
Plate Jaws.

Ask your
Industrial Distributor



Beaver STANDARD ARBORS
AND ADAPTORS CUT DOWN -TIME
LOSS—ASSURE ACCURACY FOR YOUR
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The finest economy in the purchase of arbors and adaptors is quality.

Beaver Standard Tools are made to unusually high standards of quality. No stinting is permitted on workmanship or materials. Beaver Standard Tools are made with the same care and accuracy as precision aircraft parts . . .

hard, and wear resistant, on the surface but with a strong, tough core.

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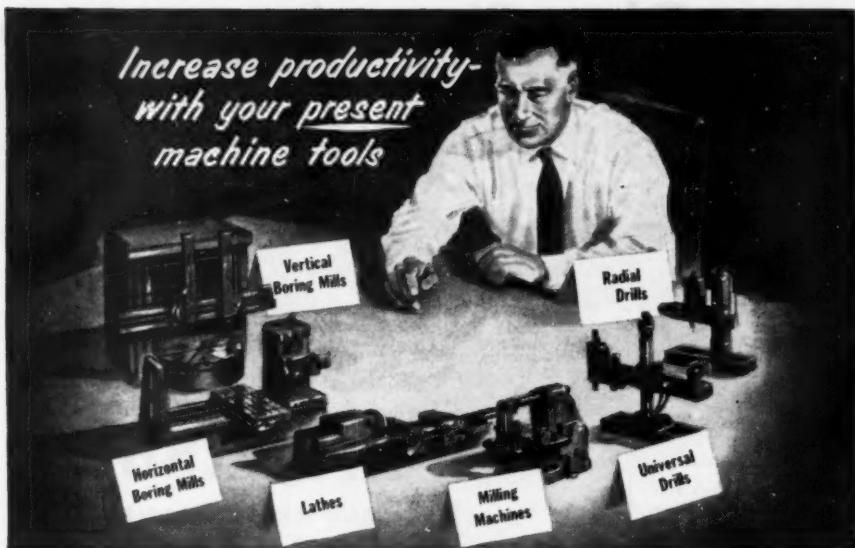
You'll do a better job with less investment with Beaver Standard Tooling—try it, you'll like it too.

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*Increase productivity-
with your present
machine tools*



Davis "Super Micrometer" stub boring tool sets give you greater machine use by eliminating cut-and-try boring. They are extremely rugged, adjustable to .0001 in.

These sets give you high-precision tools for handling heavy boring assignments from $\frac{3}{8}$ to 7 in. diameter . . . light, extended boring up to 13 in. diameter.

Delivery is almost immediate. Sets are equipped with high-speed steel cutters, other cutters furnished on request. Some sets include offset boring heads, pencil boring heads and reducing sleeves . . . setup items, such as parallels and adjustable stop jacks.

See your representative or write for details.



Set No. 11 (illustrated) contains 7 tools covering a boring range from $1\frac{1}{2}$ to 7 in. Nine other standard sets to choose from. Modifications made to meet exact requirements.

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**GIDDINGS & LEWIS MACHINE TOOL COMPANY
FOND DU LAC, WISCONSIN**

Builders of plain and micrometer adjustable block type boring tools; line boring bars; special boring tools; car boring tools; planer, vertical boring and turning mill tools; Quick Change arbors and sleeves.



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RUBBER-CUSHIONED
ABRASIVES

Each of Brightboy's widely adaptable textures consists of a special-formula "cushioning" rubber binder and matched abrasive. The rubber-cushioned action gives you a refreshing, revolutionary concept of finishing. Applications are far beyond the range of other methods.

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Because of its unique, rubber-cushioned action Brightboy simultaneously **BURRS, FINISHES, CLEANS, POLISHES** in one time-saving operation. And today its wide versatility and adaptability are multiplied many-fold because:

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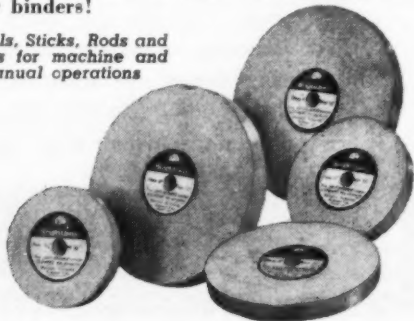
AND—Brightboy is now available in a wide variety of grain sizes ranging from extra coarse to extra fine, in soft, firm and tough rubber binders!

*Wheels, Sticks, Rods and
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NEW! ROTOR AIR GRINDERS

**LIGHTER!
MORE POWER!**



Rotor "D-6" ... the new, light-weight (9¼ lbs.) tool for heavy-duty work

Rotor "D-8" ... all the power you can use and weighs only 12¼ lbs.



ASK FOR
BULLETINS NO. 45
and NO. 46

SPECIFICATIONS

	RPM	WEIGHT*	LENGTH†	WHEEL SIZE
 D-6	6000	9¼ lbs.	22½"	6" elastic
	4500			8" elastic
	4100			8" elastic
 D-8	6000	12¼ lbs.	21¾"	6" elastic
	4500			8" elastic
	4100			8" elastic

*For straight handle. For grip handle add ¾ lbs.

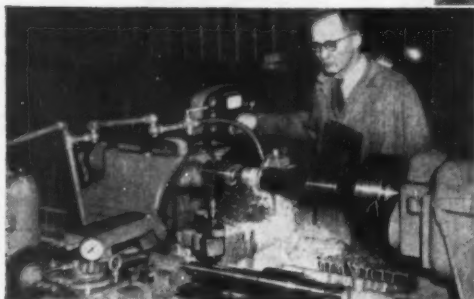
†Deduct 1½" for grip handle.

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HIGH
CYCLE

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Whatever your power transmission control requirements may be, your product will benefit by using a clutch that is exactly suited to its need. Thousands of manufacturers — in hundreds of industries — have increased the efficiency of their machines with the right ROCKFORD CLUTCHES. Our engineers are not restricted to any one type or size of clutch — but are free to specify one that is best suited to the particular operating essentials of your product.



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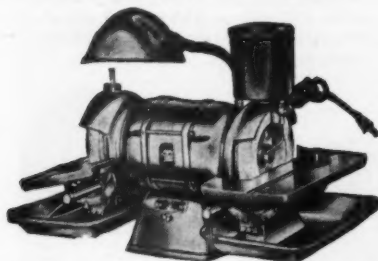
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SPECIAL CARBIDE TOOL GRINDER built especially for sharpening carbide tools quick'y and accurately. Reversible 1/2 h.p., reversible motor withstands repeated overloads.

BALDOR is a basic manufacturer of grinders—even the motors (the heart of the unit) are built by Baldor. These grinders are built for heavy-duty, precision grinding in shops and factories. They are totally enclosed, protected against dust, dirt and grit. As they are cooled and ventilated by exterior-mounted fan they cannot clog—so the internal mechanism remains clean and requires no servicing. Rotors are dynamically balanced—and each grinding wheel is balanced. Ball-bearings are "sealed-for-life" type.

may we
tell you

about the complete line of BALDOR Bench and Pedestal type grinders. Let us send you BULLETIN 321-J.



Pedestals available.

BALDOR ELECTRIC COMPANY

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ST. LOUIS 10, MO.

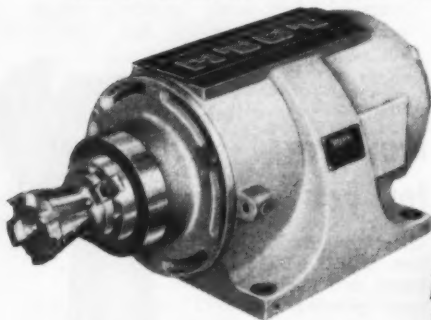


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**POPE HEAVY DUTY
 WHEEL HEAD SPINDLES**
 With Confidence

POPE Spindles like these are designed for a wide variety of applications including grinding, boring, milling, drilling and many other operations requiring **PRECISION COMBINED WITH RUGGEDNESS.**

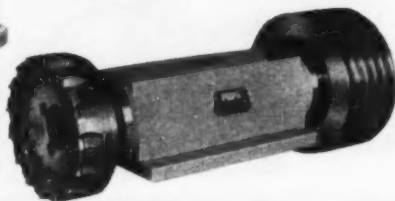
For continuous production and trouble-free operation

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P-12007 Heavy Duty Belt Driven Milling Spindle, in sizes from 1 to 50 HP.

◀ **P-2565 Heavy Duty, Totally Enclosed, Fan Cooled, Motorized Milling Spindle in sizes from 1 to 30 HP, 600 to 3600 RPM, 220-440 or 550 volts, 3 phase, 60 cycle (other electrical specifications available.)**



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 THE SPINDLE FOR THE JOB YOU ARE GOING TO DO**

No. 99

Specify

POPE

PRECISION SPINDLES

POPE MACHINERY CORPORATION

Established 1920

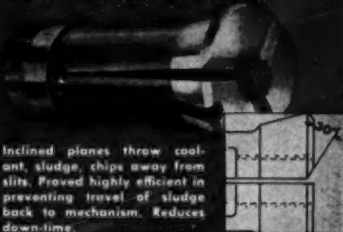
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HAVE SHEFFER CLOVER-LEAF GRIND



Depressed grind at slit assures better collet action. Standard on all sizes and designs for all automatics, lathes, mills, etc. Special collets to your prints.

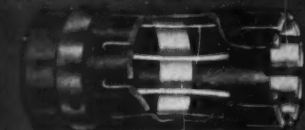
ONLY SHEFFER BUILDS THE
SHEFFER SELF-CLEANING COLLET



Inclined planes throw coolant, sludge, chips away from slits. Proved highly efficient in preventing travel of sludge back to mechanism. Reduces down-time.

SHEFFER PRODUCTS ARE BEST

SHEFFER "ECONOMY" PUSHER
GIVES MORE PIECES PER BAR



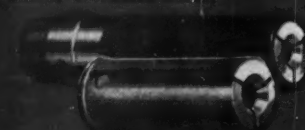
Dual bearings for positive grip with less pressure. Gives more pieces per bar. Available in solid bronze for soft finished surfaces. Also conventional and "squirrel cage" pushers.



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DIAPHRAGM
CHUCK STEPS UP
GRIPPING POWER
8 TIMES*

Simple booster mechanism multiplies air thrust. Permits stiffer diaphragm giving tighter jaw grip and wider application. Repeats to extreme accuracy. Designs for special applications.

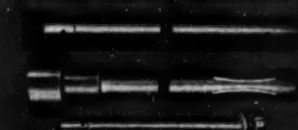
SHEFFER "BB" PUSHER HAS
SIMPLE ONE-PIECE INSERT



Single insert holds stock in most cases to full rated capacity. Reduces stress and wear. Easy to stock and assemble. Made in several materials. Also available with 3-piece pads.

*Patent applied for

SHEFFER HAS COMPLETE LINE
OF SCREW MACHINE ACCESSORIES



Collet tubes and pushers, tubes with spools, etc., collet tube adjusting nuts, pusher tube bushings for all automatic screw machines.

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MEET THE DEMAND FOR PRECISION
WITH TOOLS THAT MAKE PRECISION EASY



SAME MATERIAL – SAME SPECIFICATIONS

Why did one of these parts cost twice as much to machine?

The answer may well show up in *your* production costs. The surface finish on the part at the left was *controlled*, using a Brush SURFINDICATOR*, to meet specifications. The surface finish on the other part was *guessed at* and the part was overfinished, exceeding specifications. Cost data shows that furnishing a 32 microinch finish, where a 125 microinch finish would be satisfactory, *doubles* the machining cost.

You no longer have to guess at surface roughness and spend needless money in over-finishing. The Brush SURFINDICATOR permits you to measure surface roughness easily and quickly on the production line.

For booklet write Brush Electronics Company, Dept. I-6, 3405 Perkins Ave., Cleveland 14, Ohio. In Canada: A. C. Wickman, Ltd., Toronto.

* Trade-Mark



SURFINDICATOR* makes surface measurements easy!

BRUSH ELECTRONICS

INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZO-ELECTRIC MATERIALS • ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT
ULTRASONIC EQUIPMENT



COMPANY

formerly
The Brush Development Co.
Brush Electronics Company
is an operating unit of
Clevite Corporation.

Featured **IN THIS ISSUE**

Stock Straighteners Come of Age	151
Increase Welding Speeds With Powdered Metals	166
Simple Tricks to Use With Lathes	174

Stock Straighteners Come of Age, by William Hyams. The increased use of metal tubing in the last decade has been a phenomenon of American industry. Seamless and welded drawn tubing has replaced many other materials and has been used in many new products; which all brings problems of the tube producers. Straightening methods and machinery formerly used to meet specifications for roundness and straightness often worked against production. The manufacturers of straightening equipment have met this challenge**Page 151**

Cold Extruding Job Speeded With Tough Steels. Power extrusion is a relatively new and promising method of cold forming steel in this country. The process is being used in a large midwestern plant for the production of rocket projectile noses. By cold extruding, this manufacturer was able to lower fabricating costs and hoist production. Finding tool or die steels that could withstand the tremendous strain of the impact was a stubborn problem in getting underway since 1700 tons of pressure are exerted on a 2500 ton capacity press in the first operation.**Page 158**

Increase Welding Speeds with Powdered Metal, by L. K. Stringham. Mr. Stringham, who is chief engineer for Lincoln Electric, shows in this article how heavily coated electrodes containing large quantities of powdered metal in their coatings obtain increased welding speeds on the order of 50%, with appearance in smoothness and freedom from spatter almost equal to that obtained with automatic welding. He sees complete revision of standards for welding procedures.**Page 166**

Simple Tricks to Use With Lathes, by Tom Brown, consulting engineer. No matter how long a machinist has been running a lathe, he can still learn new tricks. And, although some operators may be entirely familiar with such applications as these

described here, many apprentices and those in technical training centers will find valuable information in the following: Simple Spherical Turning Device; Wooden Steady Rest for Centering; Increasing Speed of Chuck Changing.**Page 174**

Pre-Coated Metal Coil Saves Time, Cuts Cost in Making Clock Parts. By fabricating clock parts from pre-coated coil, Weedsport Mfg. Co., Weedsport, N.Y., makes its timepieces in less time. Advantages claimed include: Elimination of the firm's paint shop; increased color appeal; improved quality in parts.**Page 182**

Tool Life Increased When Machining Timken Alloy. A shift of carbide cutting tools in machining Timken alloy rims of jet engine turbine wheels at the Lynn River Works of General Electric Co. recently paid off in three ways: Reduced down time by two thirds, increased tool life 300%, and reduced tool breakage.**Page 186**

Troubles Encountered With Tools Most Commonly Used in Cutting Stainless Steel. This helpful information will be found in the "Know-How" REFERENCE SHEETS this month.**Page 193**

Quickie Reports on ASTE Papers. A condensation of many of the papers delivered at the recent ASTE Industrial Exposition held in Philadelphia.**Page 203**

Automatic Controls for Indexing Operations . . . Floor-to-Floor Time Reduced 10-20%, by Walton Rainey. Because positioning is time consuming, the Wiedemann people have developed a servo-mechanism for fast positioning of work on their turret punch presses. Design and operation is described.**Page 213**

Plant Communications: Ideas Must Travel Both Ways, by Edmund Mottershead. This month's Foremanship Forum is concerned with the all-important subject of getting your ideas across to the right people in the right way.**Page 229**

Practice What You Preach

Many machine tool builders tell the industry to set aside a certain amount of money for replacement. This is keen advice for the industry, but frequently they don't follow their own keen ideas.

It is always easy to tell the other guy what kind of shoes he ought to wear; for you the shoes just don't fit. We're particularly impressed with Jones & Lamson's replacement program. To be sure, J & L is not the only machine tool builder who has an intelligent replacement program, and we do not single them out because theirs is better than the next fellow's, we just happen to have been made aware of it again the other day and thought what an intelligent approach this machine tool builder has to replacement.

At J & L a replacement program is established at the end of each year for the coming year. Naturally, such a program is of little value unless money is made available; hence their program is funded out of current sales dollars. After the close of every four-week accounting period 2% of the net sales dollar is set aside in a special account for the express purpose of buying capital equipment. It is important to realize that current dollars are set aside to meet current capital goods prices.

The board of directors does not pass on capital purchases, they only enter the purchasing picture when plant expansions or extra large capital expenditures are planned.

The J & L replacement program is based on the MAPI formula from which it is determined whether obsolescence will dictate a replacement. When it is felt that it costs more to run an old machine than to purchase a new one a meeting of factory manager, chief process engineer, plant superintendent, production manager and maintenance and equipment engineer determines what type and make of machine to buy. A memo outlining the cost savings to be gained through the new machine, as well as other pertinent information, is sent to the general manager who approves or questions the requisition. Occasionally the question is raised by the general manager regarding the claimed money savings involved and not the desirability of the purchase.

The accounting department prepares a statement at the end of each period showing:

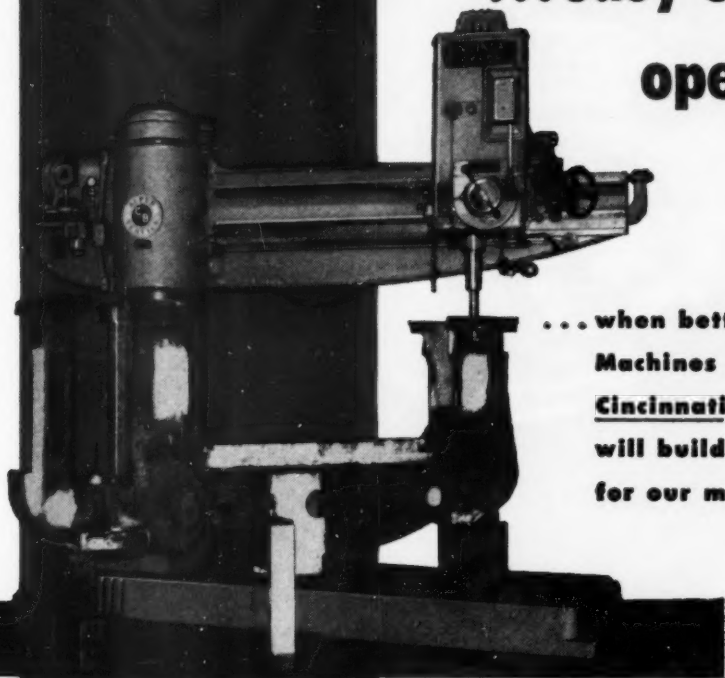
1. Amount of cash in the fund at the beginning of each period.
2. Amount deposited to the fund (based on previous period net sales).
3. Amount withdrawn from the fund (previous period purchases).
4. Balance in the fund at end of each period.
5. Itemized commitments against the fund.
6. Amounts over or under committed. (The amount which may be over committed is established by the board of directors.)

The success of this replacement program is reflected in a well equipped plant which produces top quality work.

William F. Schleicher

BIRDSBORO STEEL FOUNDRY
AND MACHINE CO. says....

**"THIS MACHINE IS
well engineered
...easy on the
operator**



**... when better Drilling
Machines are built,
Cincinnati Bickford
will build them
for our money"**

A 40% cost saving is effected by this Cincinnati Bickford Super Service Radial Drill.

This 10,600 lb. carbon cast steel bottom roll housing for steel plate leveler is being spot faced to a 5' dia. $\frac{3}{8}$ " deep. Floor to floor time was 25 minutes and now only 15 minutes.

Handling with finger touch ease this Bickford Radial is giving a wonderful performance.

Investigate these fine machines. Write for Catalog R-29.



RADIAL AND UPRIGHT DRILLING MACHINES

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BICKFORD**

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.



Radius
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Tools



"Tru-Line"
Profile
Dressing
Tools



Diamond
Grit Tools
for Thread
Dressing



"Tru-Thread"
Thread
Dressing
Tools



HYDRAULIC

DIAMOND-MISER *by Wheel Trueing*

Automatically develops and maintains multiple, sharp diamond facets for maximum wheel dressing efficiency.

Wheel Trueing Diamond-Miser is a tool-holder unit which is operated from the hydraulic system of the machine and which automatically provides uniformly metered diamond tool indexing.

Because the indexing is automatic, it is assured and dependable; cannot be accidentally neglected.

Because it is precisely metered, it produces multiple, uniform diamond facets which are re-sharpened in each pass of the tool, with minimum wear on the wheel.

The improvement in wheel dressing, increase in number of pieces produced between dressings, reduced diamond wear and longer wheel life, result in important economies.

The Diamond-Miser is available for centerless, cam, crank and universal grinders; single or multiple wheel mounts. May we send you our descriptive booklet?

WHEEL TRUEING TOOL COMPANY

45-3200 West Davison Avenue • Detroit 38, Michigan

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33 West Street, Bloomfield, N. J.

WHEEL TRUEING TOOL COMPANY OF CANADA, LTD.

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Letters TO THE EDITOR

Credit Where Credit Is Due

It has recently been brought to our notice that in the October, 1953, issue of your publication there appeared an article entitled "New Studies Show Errors in Many Present Tooling Practices," by Clifford T. Bower. This article was based on an interim report drawn up by the Technique of Tooling Study Group formed by the London Graduate Section of this Institution.

While the Institution is of course appreciative of the publicity given to the work of this Group, we feel there could have been a more definite acknowledgment that the material embodied in the article, including the illustrations, was the result of research carried out entirely by members of the group. I think you will agree that casual readers might have assumed that part of the article, at least, described work carried out by Mr. Bower.

We feel sure that there was no intention of giving such an impression, but we wonder if it would be possible for you to publish a note making it quite clear that the material originated entirely from our Study Group?

*Miss M. S. C. Bremner
Institution of Production
Engineers
London, England*

The fourth paragraph of the article (as published by BLUE BOOK) reads "... The tests were made by the Technique of

Tooling Study Group formed by the Graduate Section of the Institution of Production Engineers, London, England, and are but a section of a planned extensive series of probes into the efficiencies of various jig and tool elements."

Both Mr. Bower and I felt the paragraph quoted was sufficient to identify and credit the source; however, I must agree with reader Bremner that the casual reader might slur over the paragraph and miss the credit. The work of this Group is important enough to warrant full recognition and we wish to point out that the article, and illustrations, in question is but a report by Mr. Bower of the work performed by this Study Group. Incidentally, the Group has begun a splendid piece of work, one which in our estimation has needed doing for many years. We wish them success with their work and hope that we may have the pleasure of presenting further results of their work to our readers.

By the way, the Institution of Production Engineers corresponds to our American Society of Tool Engineers.

Jet Power

In your MACHINE and TOOL BLUE BOOK "Jet Power" January, 1954, issue you published a series (1 to 9d) of articles by William F. Schleicher, Editor—covering Jet Power.

We are wondering if this series is printed in any other form such as loose-leaf, brochure, etc. If so, we would appreciate your forwarding to us six complete sets of the series. If not, please forward six copies of the MACHINE and TOOL BLUE BOOK "Jet Power" issue. You may forward these to us C.O.D. or bill us, whichever basis you prefer.

H. L. Northrup, Vice
President & General Mgr.
Chicago Roughide Mfg. Co.,
Greenview Div.

Six copies have gone forward to Reader Northrup with our compliments. Copies of the Jet Power issue are available as long as the supply lasts.

Could you furnish me with a copy of the article "Latest Developments—Carbide Machining of Heat and Corrosion Resistant Metals," by Fred Lucht, published in the January, 1954, page 181, issue of your MACHINE and TOOL BLUE BOOK.

I understand that this article is extremely helpful in solving many of the current problems encountered when machining high temperature resistant metals.

W. W. Gilbert, Mfg. Eng.
General-Electric Co.

Tear sheets of this outstanding article have gone forward to reader Gilbert.

S.F.M. in Milling Operations

I would appreciate having you send me a set of tear sheets on "How to Select the Proper S.F.M. in Milling Operations", by H. A. Frommelt, in the September, 1953, issue of MACHINE and TOOL BLUE BOOK.

Wilford L. Stork, Professor
The City College

If still available for distribution, will you please send us tear sheets of the article "How to Select the Proper Surface Feet Per Minute in Milling Operations" which appeared in the September, 1953, issue of MACHINE and TOOL BLUE BOOK.

D. Elliot Steel, Engineer
The Hines Flask Co.

Tear sheets have been sent to readers Stork and Steel.

New Diamond Wheel is News

Our engineers require the following articles: "New Diamond Wheel Grinds to Depth of $\frac{1}{8}$ " in Carbide Without Loading." This appeared in the September issue of the BLUE BOOK.

If tear sheets are available . . . etc.

Lotta C. Strong, Librarian
International Harvester Company
Chicago, Ill.

We are interested in securing an additional copy of the article entitled "New Type Diamond Grinds to $\frac{1}{8}$ " Depth in One Pass Without Loading" appearing in the September, 1953, issue of the BLUE BOOK.

If you have reprints of this article, we will appreciate your sending us one copy.

L. K. Walter
W. O. Barnes Co., Inc.

Paper Work . . . Paper Work

Will you please advise whether or not it will be possible for me to procure tear sheets of the article entitled "Orders, Invoices, Stock Controls, etc. No Longer a Time-Consuming, Expensive Problem" by E. E. Reeves as published in the December, 1953, issue of the BLUE BOOK.

R. W. Metzger, Ind. Eng. Dept.
General Motors Institute

Tear sheets have been sent.

Flying Saucers

In the "Last Minute Washington News" section of the January issue of the BLUE BOOK reference is made to a recently issued book entitled "Flying Saucers Have Landed." Will you please inform me of the publisher's or distributor's address.

H. O. Lehman
The Firestone Tire and Rubber Co.

The book in question is available from The British Book Centre, 420 W. 45th Street, New York 36, N.Y.

Honeycomb Processing

This facility would appreciate very much receiving a copy or tear sheet of your article "New Honeycomb Processing Method", by Frank Charity.

If there is a charge for this service . . .

J. M. Thompson, Jr.,
Chief Metallurgist
Consolidated Vultee Aircraft Corp.

Tear sheets sent with pleasure. No charge.

LAST MINUTE WASHINGTON NEWS

★★★

The first quarter drop for 1954 can be seen most plainly in the statements of hardgoods makers, particularly producers and users of metals. The demand for durables has definitely shrunk. The profit down side of the ledger is sprinkled heavily with steel companies, along with makers of appliances and machinery. U. S. Steel sales are down 10.5% from '53 first quarter, profits down 9.2%. Republic Steel sales slid 26.8% and earnings went down 19.6%. Others fared about the same. But, General Motors reports income of \$189 million compared to \$151 million first quarter of '53.


The unhappy state of the metals industries could be attributed to several things. At last year's start, the Korean war was still demanding great amounts of metal. Mr. and Mrs. America were spending freely--appliances, cars, etc. Manufacturers were pouring it out. Then war's end and we stopped buying. Inventories piled up. Sales skittered downward. Loss of the defense dollar didn't hurt so much as the loss of the civilian dollar, even though defense spending dropped off much more than civilian.

However, some situations seem to go contrary to the general run of affairs--take such corporations as General Electric or Armco Steel. The former reports the largest first quarter net in history and Armco has profits up \$1.3 million from last year. Those who have reported hikes seem to have either profited by the demise of the excess profits tax, to have successfully cut costs, or both.

Markets for the nonferrous metals, though lacking strength, have derived a certain stability, in business trends, from several factors. Domestic producers have cut back output because of such reasons as lower prices, less demand, or rising imports. Foreign demand was held high, and speculators abroad have been pinched. Washington's stock-piling has made a difference, too. Although the world price of tungsten is \$30 a short ton, several months back it was \$15. Under long-term contracts, the U. S. kept on paying \$63. Such activities tend to give any market an air of artificiality.

And, speaking of tungsten, historic and fabulous mining operations of North Carolina have been overshadowed by a relatively recent, but the richest, strike ever made in the state (Vance county).

Tungsten, with the highest melting point known to man, is coming from the tarheel state at the rate of 800 tons of ore per day. In the few years that the Tungsten Mining Corp. has



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been operating, some \$25 million of black tungsten has been taken from the nine mile long ridge that is a mile or more wide and no telling how deep. The present output rate runs to approximately \$9 million per year.

But, aside from the gloom many forecasters see, most corporate reports show continued good news for stockholders. In general, dividends have been far less sensitive to recession forces than either sales or earnings. Most dividends have held even with last year's and some have risen slightly. All in all, it could be a whole lot worse.

Joel S. Mitchell, Standard Brands president, has predicted the company's sales and earnings this year will be "well maintained . . . the underlying long-term growth trend in the food industry can well continue even in the face of less favorable conditions in the general economy."

The Vance plan for a machine tool reserve is probably shot. The Appropriations Committee has knocked the \$250 million project from the defense department appropriation for 1955. The original aim was to build up standby capacity for arms production by advance buying of long lead-time tools.

An east German trade mission has arrived in Argentina to negotiate a swap of German machinery for Argentine agricultural products, following a similar recent move by the Russians.

Columbia has put the clamp on steel and iron importing. Bulk shipments and a number of finished products, many from the U. S., are banned. This was caused by anticipating the opening of Columbia's own new steel mill Paz del Rio; it's now scheduled to go into production later this year.

Revision of Taft-Hartley has bogged, though Ike wants it badly; he promised it in his campaign. He may have to settle on nothing. Social security liberalizations may be until next year, also. Most Republicans on the House Ways and Means committee opposed boosting the wage base for social security levies from \$3,600 to \$4,200 a year, which means the ten Democrats on the committee will have to line up solidly to win.

Latest dope on employment shows jobs in areas other than manufacturing and farming are holding up. There are almost as many jobs in trade, construction, and utilities as there were a year ago. But, manufacturing jobs are off; total drop, 1.3 million; continuing decline in number of workers in durable goods industries, transportation, and mining--all closely tied to defense activity. This month will be a tough one on the labor situation; this is when the labor force gets a big boost as boys and girls get out of school. Washington expects 4 to 4.5 million with a sharp decline in the fall ahead of elections and and schools open.

Advertising is going strong; a poll of major national advertisers shows that 71% of 43 firms have boosted ad budgets, 29% have kept budgets the same, none has lowered expenditures. This is despite the fact that 23% of the firms report a sales dip.

Sarnoff of Radio Corp. of America says color TV will help in exceeding \$1 billion a year; 1953 volume was \$853 million and 1954 looks better.

Personal income in March was down to an annual rate of \$282.8 billion, \$800 million below March '53, \$200 million from this February.

April outlay for construction hit \$2.8 billion, up 1% from last year and a new high for the month . . . April gained 9% from March . . . first four months of year was up 1½% over last year to \$10.1 billion. Economists say that these record construction figures provide a sturdy prop under the economy when other sectors such as industrial production and sales in business have shown dips from last season.

Lenders once again are wooing the borrowers; they're out hunting contractors, looking for places to put their money. However, sales of used houses, even new ones, are slow in places . . . down payments too high.

Italy is reportedly completing plans for construction of a synchrotron, large atom smasher, of a billion electron volts energy and a big nuclear reactor for production of electric power.

Using a 21 Curie cobalt-60 source belonging to Keio University hospital, Japan will launch a research project to probe sterilization of food by use of gamma ray radiation.

Remarks from a recent talk given by Henry D. Smyth, member U. S. Atomic Energy Commission, at the Third Annual Conference of Business Economists, University of Chicago, emphasizing the economic aspects of nuclear power, included: "My general overall assumption will be that technical progress within the next 20 years will bring nuclear power costs down to somewhere around 4 to 8 mills per kilowatt hour."

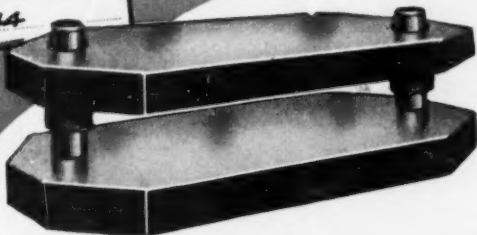
Smyth goes on to point out that: ". . . apart from general economic considerations, there are special reasons which may make it desirable to build nuclear power units in this country before they can compete generally with conventional plants. A nuclear power plant, once built, can run many months on its initial fuel charge. This could be very important in time of war. There is also the dual purpose feature inherent in many reactor designs which make it possible for such reactors to produce atomic explosives as well as power.

"Nuclear power plants differ from normal power plants only by substitution of a nuclear reactor for the firebox and boiler. The steam turbines will be essentially the same and so will the electric generators. The gradual introduction of nuclear power does not represent a new industry but merely the modification of a familiar one. The change consists in the substitution of a new fuel for an old one, but this must take place rather more slowly than the substitution of oil for coal in commercial power furnaces because a totally different type of furnace is required. Since nuclear power will be a minor factor in a

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1800 Stainless Steel Threads



LANDMATIC HEADS are every day saving production dollars for the Crawford Fitting Company of Cleveland by low tool cost and minimum machine downtime.

This company manufactures Swagelok Tube Fittings ranging from $\frac{1}{8}$ " to 1" in diameter. These fittings are produced from stainless steel tees of austenitic type 316 cold-worked to a Brinell hardness of 250. In producing the 7/16" fitting, for example, (as illustrated) 20-pitch straight UN threads are cut close to the shoulder 5/16" long to Class 3 fit.

LANDMATIC Hardened and Ground Heads, such as used by Crawford, are designed to produce threads to Class 3 or 4 fit in all types of tough materials. Unusually heavy construction and sound funda-

mental die head design assure the rigidity necessary for accurate threads. The inherent features of the design of the Landis Tangential Chasers and their proper manufacture and hardening, developed during 50 years of threading experience, ensure long chaser life and low threading cost.

If you require threads on stainless steel or other tough material, LANDMATIC Hardened and Ground Heads offer you these same cost-saving features. Please send specifications and write for Bulletin F-80 for additional information.

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THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

387

major expansion of power plants, the demand for other fuels in this period will increase rather than decrease.

"The building of a considerable number of large nuclear power plants will make some demand on special skills and special materials. These will largely fall in the general area of the chemical and metallurgical industries and should be readily absorbed. . ."

The '52 report of the President's Materials Policy Commission estimated that energy requirements in the U. S. for all purposes would double in the next 25 years while the consumption of electric energy would triple in that period. Conventional fuels, which are the present sources of energy, are considered adequate to meet these expanding needs up to 1975 with little or no increase in real costs. Beyond 1975 the picture is more uncertain. Coal in America is abundant, but its real cost will probably go up. Proved reserves of oil and gas are respectively 12 and 27 times present annual consumption. Discovery of new fields cannot be guaranteed and already the cost of finding new reserves is rising. The energy potentially available in the world's reserves of mineable uranium has been estimated as between 20 and 25 times the energy from world reserves of oil, gas and coal added together.

Practical suggestions on how smaller manufacturers can put effective sales training programs into action are contained in a new booklet issued by the Small Business Administration.

The booklet, "Sales Training for the Smaller Manufacturer," is Number 11 in SBA's Small Business Management Series and may be obtained from the U. S. Government Printing Office for 20¢ per copy.

The booklet contains a complete outline of sales training that the small manufacturer can use with a minimum of time and cost, and a maximum of success.

According to the booklet, the need of sales training has become more evident with the multiplication of new products and the greater variety of old ones. Also, with increasing efficiency in production, business must stabilize itself primarily by increasing the efficiency of distribution. One way to do this is to send only trained salesmen into the field and keep them well informed through the years.

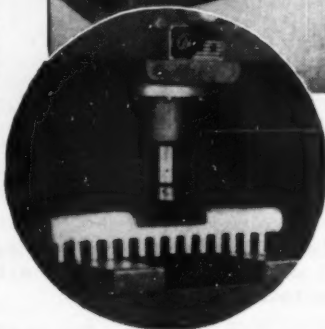
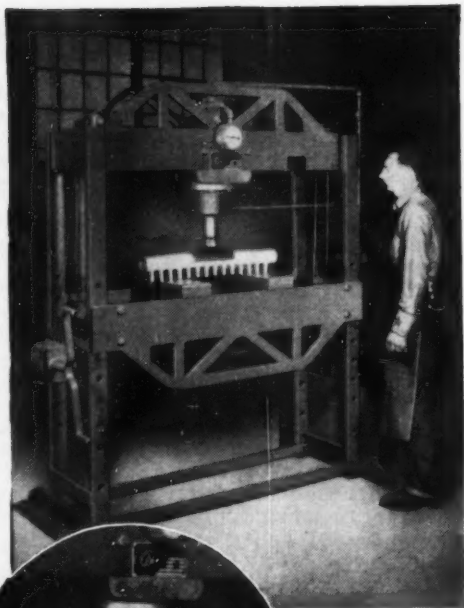
"Today, as most perceptive managers are getting set for increased competition, selling becomes increasingly important. It becomes of greatest importance, however, to small manufacturers--many of whom have not had a national reputation, well-established brands, or a generous advertising budget.

"The fewer salesmen a company has on the road, the greater responsibility each man has to carry. For this reason much time and careful thought must be spent on training these men properly. They are very important representatives."

Another KRW HYDRAULIC PRESS living up to it's reputation!

Like most metalworking plants, Niagara Blower Co. has a number of straightening problems in their operations — pieces that warp or bend out of shape after punching or welding. And Niagara solves these problems with this KRW motor-driven hydraulic press. It is used for straightening headers, header ends, bar irons, and other components of the company's line of heat exchangers. Niagara officials tell us that this KRW Press has really lived up to its reputation for speed, accuracy and versatility. They especially like two features of their KRW Press: the ease and accuracy with which the ram can be inched down to the work and the speed with which it converts from one set-up to another.

Let KRW help with your pressing problems. We make a full line of one, two and three cylinder Hydraulic Presses; 25-150 ton capacities; hand, air or motor-driven. Check with your Machinery dealer or write us for literature and prices.



KRW 37F, 75 Ton Motor Driven Hydraulic Press with special wide bed used at Niagara Blower Co. for straightening and bending operations in the manufacture of Heat Exchangers. Press is shown straightening an aluminum header.

ONLY KRW GIVES YOU ALL THESE FEATURES:

- **Heavy Construction Throughout.** Bed and Crown Members Truss Reinforced for Added Stiffness and Strength. A KRW Exclusive Feature.
- **Any Tonnage Pressure** up to Rated Capacity can be Obtained Quickly and Selected Pressure Locked for Repetitive Operations.
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- **Excellent "Inching" of Ram** Because Motor Runs Only When Operator Moves Ball Arm for Downward Ram Travel.
- **Spring Return of Ram** Gives Maximum Speed on Up-Stroke.
- **Highest Quality Radial Type Hydraulic Pump.**
- **Direct Connected Motor Drive** Through Flexible Coupling.
- **Two Speed Hand Pump** also Furnished on Motor Driven Presses in this series.

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Designers and Builders of the Right Hydraulic Press to Solve Your Metal-working Problems!

How's BUSINESS ?

Optimism at ASTE Show

PHILADELPHIA . . . Most encouraging fact to emerge from the recent ASTE show in Philadelphia was the high optimism displayed by both exhibitors and visitors. Exhibitors with good products which they backed with commendable merchandising efforts laughed at recession talk.

"We've sold more during March and April than we did last year," said one exhibitor. "This show has built up our backlog of from two to four months," said another. "Business has been good for us. Orders are coming in steadily; possibly not in the ganged-up rush of several years ago, but steady, dependable orders which are helpful to our production setup," said another manufacturer.

Outstanding in the show were products designed for automation; not necessarily as components for special machinery, but automatic attachments. While it is almost impossible to list all of the many new devices first displayed at this show, several broad categories may be defined.

Automatic loading and feeding attachments for punch presses showed a remarkable development over recent years. One manufacturer showed attachments for loading and stamping operations which increase production several hundred per cent. Initial cost of equipment is not high compared to the immediate savings. Important is the fact that these developments may be applied to almost any type of stamping operation.

Hopper feeds were ingenious and presented a wide variety of uses for different types of machines.

Automatic gaging and sorting for use with mass production parts were greatly in evidence.

The strides that the use of air-operated equipment has made in recent years is nothing short of outstanding. Manufacturers of cylinders, valves, and other components to air-operated equipment showed a wealth of applications in loading, machining, unloading and handling. Air-operated equipment can be used on almost any machine tool. We were particularly impressed by an attachment to a tapping operation in which air fed the part, activated the tapping cycle and unloaded the part.

Among machine tools one of the important developments was the introduction of a tool and cutter grinder which has all the features of an expensive model, yet sells in the medium price range. Of interest in this tool and cutter grinder is the fact that the wheel moves past the work instead of the work passing by the wheel. Wheel can be handled with one finger, removing a great deal of operator fatigue from the operation. This grinder was received with a great deal of interest by the visitors.

While components for automation came in for their share of visitor attention, the bulk of exhibitors displayed a wide variety of standard products used by every shop in the country. In those cases where the design was good and merchandising efficient business was reported as excellent.

Over 35,000 visitors toured the show and bought equipment and it is important to understand that in spite of all the dramatic talk of automation and the interest in this subject, when the chips are down, the standard, garden-variety of tools and accessories are still the bread and butter of most of the manufacturers, and are also of major practical interest to the majority of visitors.

Approximately 500 exhibitors showed several million dollars worth of equipment.

Accompanying the show were conferences and forum discussions. Quickie reports of many of the papers read at the meetings are in another section of this issue.



J. P. Crosby

Joseph P. Crosby, vice president of the LaPointe Machine Tool Company, Hudson, Mass., is the new president of the American Society of Tool Engineers.

Sales Dip, Not Profit

PITTSBURGH . . . While the sale volume of the steel industry dropped in

the first quarter of 1954 over the same period last year, the profit decline has not been as great. For example: U. S. Steel's sales dropped 10.2 in the first quarter of this year, yet income dropped only 9.2%. Republic Steel's first quarter sales were down 27% over last year, yet the income dropped only 19.5%.

Several reasons explain this seeming discrepancy between sales and income: (1) the removal of the excess profits tax as of last January, (2) the reduction or elimination of several high cost factors such as overtime, etc.

According to Benjamin F. Fairless, chairman of U. S. Steel, the first quarter of 1954 may not be the low water mark for the steel industry. U. S. Steel's first quarter output, said Mr. Fairless, averaged 80.8% with current operations running at about 70%.

In contrast to the generally low production rates of steel producers, Inland Steel's ingot output rate was 96% in the first quarter with Inland's chairman, Clarence B. Randall, "hopeful" that this rate could be duplicated in the second quarter.

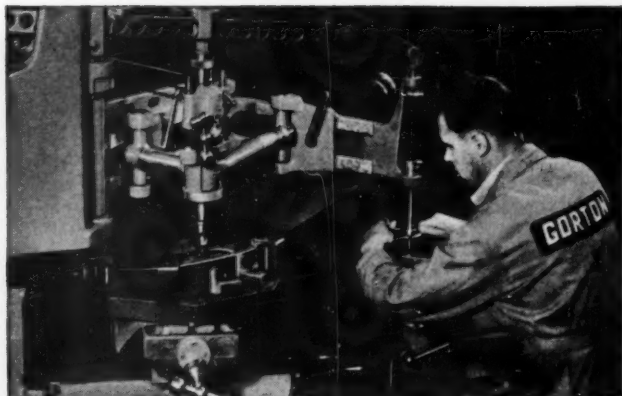
Leasing is Successful

BOSTON . . . Speaking before the same conference as A. V. Bodine was Francis J. Trecker, president, Kearney & Trecker Corp., Milwaukee, who said his company's leasing program has resulted in increased sales.

Since the program started leasing agreements of more than \$1 million were written; another \$1 million worth of agreements are in progress. Altogether approximately \$2 million worth of outright sales were made. The program has been eminently successful with both K & T and lessees benefiting.

Depreciation

Boston. . . No "incentive taxation" is needed to persuade manufacturers to modernize, A. V. Bodine, president of the Bodine Corporation, Bridgeport,



Gorton Pantograph Does Job 7 Times Faster

In only 40 minutes this tracer-controlled pantograph cuts and blends a thermal slot in an 8-foot steel propeller blade — a job that requires 5 hours 10 minutes by other methods. This is typical Pantograph performance—one of hundreds of examples.

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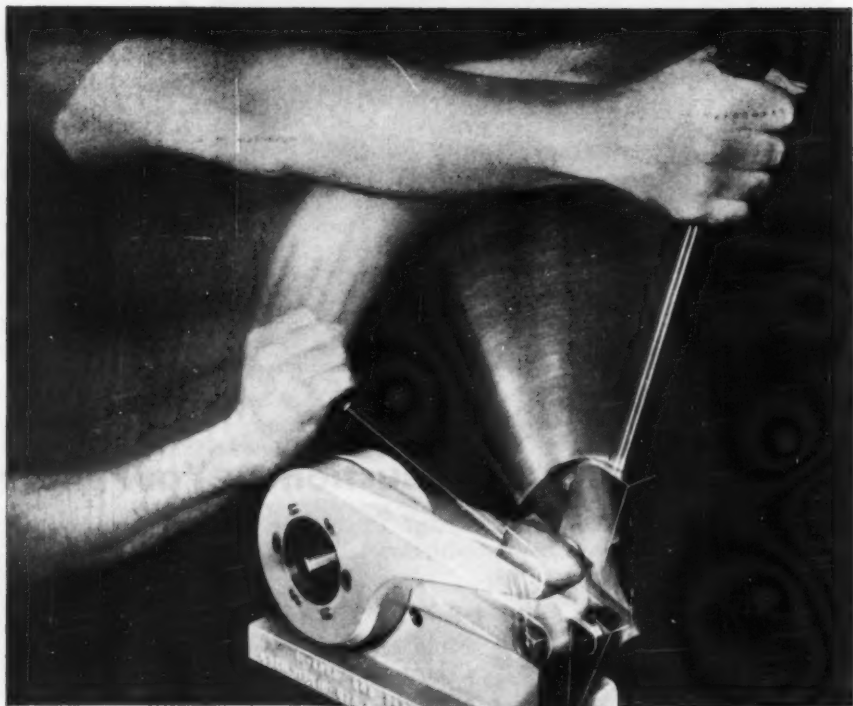
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Conn. told members of the New England Council Industrial Opportunity Conference held here at the Hotel Bradford.

All that is necessary to speed modernization, Bodine pointed out, was to remove the tax penalty upon modernization which government has for years imposed upon industry through regulations of the Internal Revenue Department covering depreciation allowances.

"Today, when buyers of machine tools face the arithmetic of modernization," Bodine said, "they find themselves subjected to a terrific tax penalty because they are bound by the provisions of

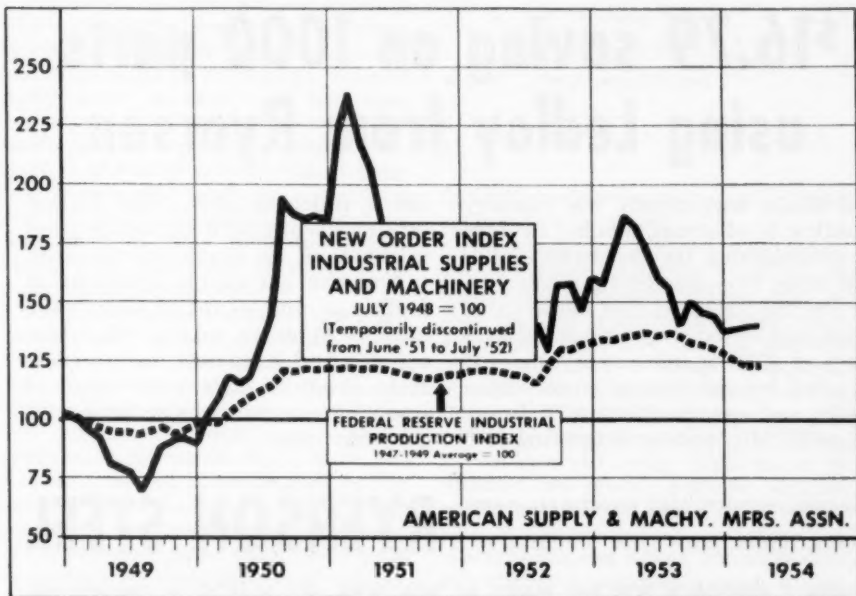
Treasury Decision 4422 and Bulletin "F". When to these limitations is added the inflation factor, the result is that, in most cases, only a minor share of the cost of new equipment can be met by depreciation previously accumulated on the machines to be replaced, and the major share of the cost of modernization must be met out of earnings after taxes. Furthermore, with depreciation enforced over at least a 20-year period, they cannot expect to recover the capital invested within the period of the useful and profitable life of the equipment purchased.

PITTSBURGH . . . The new order index of industrial supplies and machinery shows a gain for the third consecutive month. The March index as reported by the American Supply & Machinery Manufacturers' Association, was a one-point gain over the February figure of 140.5.

Each month during the first quarter the index has gained over the preceding month, beginning with a recent low of 136.7, es-

tablished in December 1953.

This measure of orders placed is running counter to the Federal Reserve Industrial Production Index, which has declined uninterruptedly since September 1953. The steady rise in the order index suggests an early reversal in the production trend, for this index is based on orders placed by industrial distributors, who in turn supply the manufacturing industries.



Under actual shop conditions the part shown at the right was produced in quantity on a Brown & Sharpe O. G. automatic. First the parts were produced from B1113. Then Ledloy from Ryerson stock was used. Here are the results:

MACHINING TIME

	B1113	Ledloy
Seconds per part..	33	24
Hours per 1000 pieces..	13.15	9.57

COST PER 1000 PIECES

Set-up cost.....	\$00.50	\$00.50
Machine time and labor based on \$5 per hour..	65.75	47.85
Steel cost.....	7.92	9.83
	\$74.17	\$57.38



\$16.79 saving on 1000 parts using Ledloy from Ryerson

In shops throughout the country Ledloy is effecting similar savings—establishing its superiority over all other free-machining steels.

On the average, this remarkable lead-lubricated steel brings net savings of 25% or more everywhere it is used by permitting much faster feeds and speeds (25 to 50% faster than B1113) and by extending tool

life as much as 200%. Still Ledloy retains the strength and other good qualities of an open hearth steel.

You can get quick shipment of Ledloy in any quantity from your nearby Ryerson plant. Rounds, squares and hexagons are immediately available in a wide range of sizes. We suggest you order a trial quantity now.

PRINCIPAL PRODUCTS: BARS, STRUCTURALS, PLATES,
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MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Stock Straighteners Come Of Age

THE INCREASED use of metal tubing in the last decade has been a phenomenon of American industry.

Production of precision-made tubing in small diameters has surged vigorously upward in the last ten years; seamless and welded drawn tubing has replaced many other materials and has been generously employed in many new products. However, the increased production of tubing brought with it many problems to tube producers. One acute problem was the need for meeting close tolerances on tube roundness and straightness without slowing down straightening equipment.

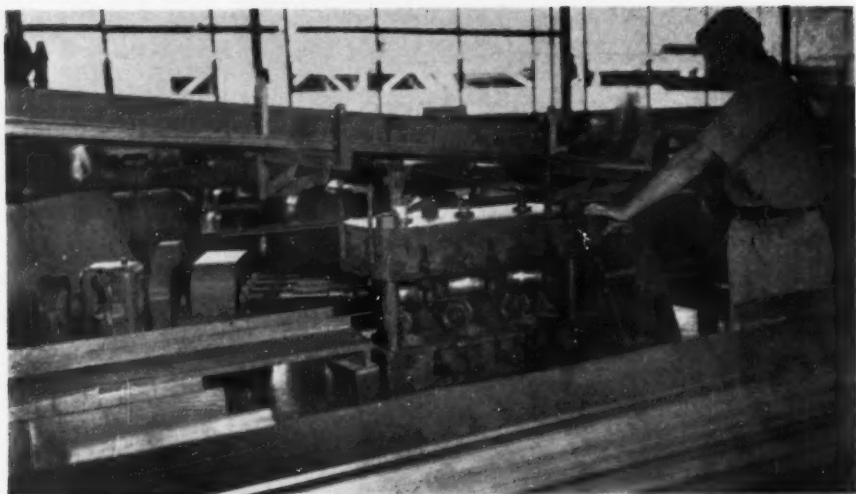
Straightening methods and machinery used to meet specifications for roundness and straightness worked against mass production by these specialty plants. For one thing, methods and machines would not volume-produce to tolerances which were becoming more and more exacting as the use of ferrous and non-ferrous tubing increased. Low-speed operation, amount of "down-time" when straightener rolls or guides were being dressed or "set up" for diameter change, plus variations in

By **William Hyams**
Mackintosh-Hemphill
Pittsburgh, Penna.

finished product tolerance, all worked against volume output.

One particular problem was objectionable spiral or scoring markings on high-finish specification tubing such as that used for plated automobile radio antennas. Production men in end-use plants often had to accept commercial specification tubing and finish it to fit their particular needs.

Shortly before the end of World War II, we received many inquiries as to whether we could produce smaller adaptations of our heavy-duty rotary pipe straighteners to permit handling of small-diameter tubing. These requests for smaller straighteners were turned over to our engineers who designed



This rotary straightener in the Bridgeport, Pa., plant of Tube Methods, Inc., effectively straightens new types of tubing having a composition of alloys to provide high corrosion and/or high temperature resistance. This machine works on tubing ranging in diameter from $\frac{1}{4}$ to $\frac{3}{4}$ in., having walls as heavy as .095 in., in 20 ft. lengths, and at a production speed averaging 150 ft. a minute.

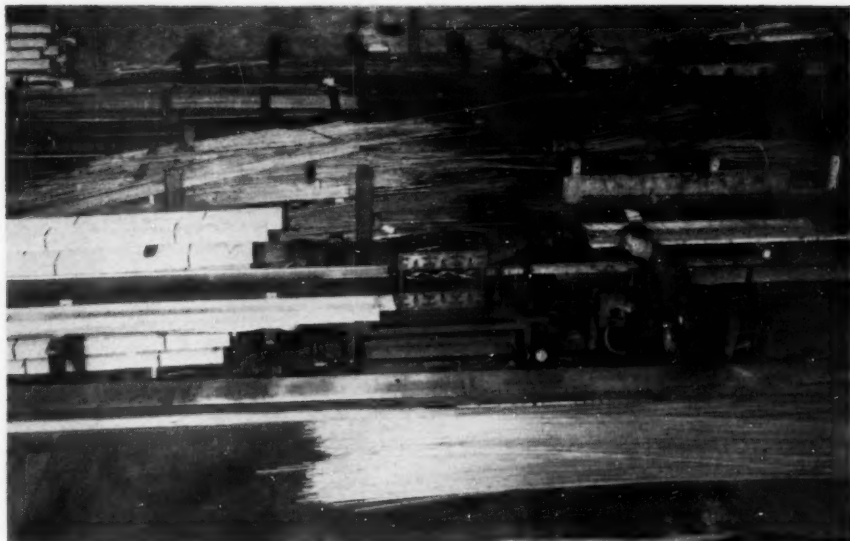
several new models. Each of the new machines was capable of straightening a range of progressively smaller-diameter stock. offset-pass arrangement of six power driven rolls.

These smaller models were specifically built to handle and deliver, at high speed, both ferrous and non-ferrous metal tubing which would be round and straight within close tolerances. On the new models, small-diameter tubing is now straightened without damage to surface finish, because the design of the straighteners eliminates the need for guides.

Twelve models, made to handle stock with OD of from 5" to 15" in the largest size, down to metal tubing or bar stock with OD's of from .050" to .250", are now available from Mackintosh-Hemphill. All models have a similar

Many plants have installed various sizes of these small rotary straighteners. Some plants produce copper or brass tubing used in instruments such as thermostats, electronic capacitors, and bourdon springs for pressure gages. Large quantities of tubing are used today in the manufacture of mechanical pens and pencils. Aluminum tubing is used for arrows in archery equipment. Steel tubing is fabricated into axles for toy cars, trucks and doll carriages. The hundreds of thousands of telescopic automobile radio antennas seen on the highway are all precision-made from tubing.

Stainless steel tubing has a big market today, as have the many special alloys



Some 75,000 lbs. of seamless copper tubing are straightened each week in the Cleveland plant of Viking Copper Tube Co. by the rotary straightener seen above. Note how the run-out table has been designed so straightened tube drops immediately into shipping boxes. The unit is also occasionally used to increase tube hardness as much as ten points on a Rockwell 15-T scale by a "skin-hardening" pass through the machine.

now on the market to provide specific resistance to corrosion and high temperatures.

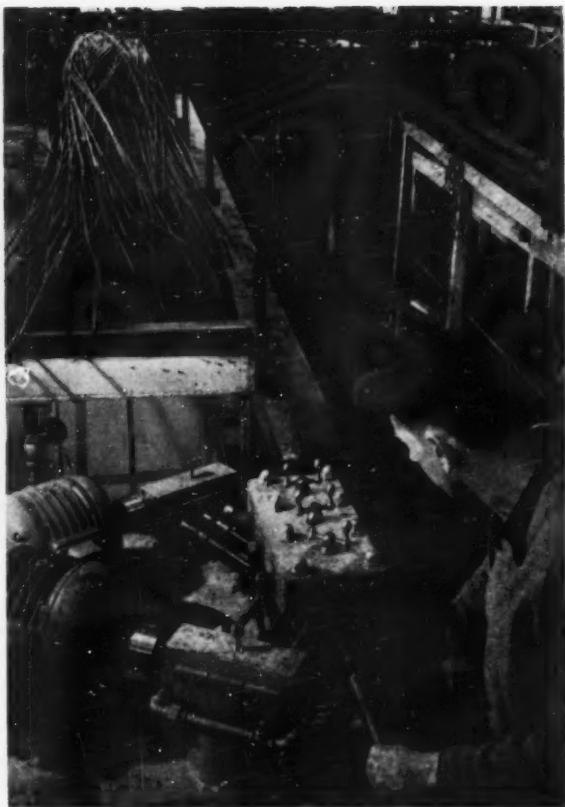
We recently made several important design improvements on the first of our small diameter rotary straighteners, the Model AX. This model, with its two 3 hp. drive motors and the drive spindles, is mounted on a unit steel table. Bolt holes in the feet of the table allow it to be permanently installed on a production line, or quickly re-located for varied production requirements.

A circulating flood lubrication system for the six driven rolls of this straightener is now provided. Experience with this model, particularly in plants handling aluminum and other non-ferrous tubing, indicated that application of a

petroleum-base liquid solvent is advisable. The lubricant is now directed at the points tubing is in contact with each pair of rolls. Use of lubricant materially improves straightening, washes away metal particles which might have marred tube surface, and dissolves the residue of the solutions used in drawing operations.

Steel shields deflect any splashing lubricant into a collection tray, for recirculation, while covers have been provided for the six drive spindles as a safety measure. Where volatile solvents are used, explosionproof motors are standard equipment for driving the straightener rolls and for the circulating lubrication system. This model, which handles tubing or pipe of from

An interesting example of straightening carbon and alloy steel tubing. Bent, "bowed" and otherwise out-of-shape tubing at the top-left of the above picture is straightened by the rotary machine and appears neatly racked just below the straightener. This picture was taken in the Carnegie, Pa., plant of the Summerill Tubing Co., a division of the Columbia Steel & Shafting Co. This machine was installed the first of 1951 for handling steel tubing ranging in O.D. from .156 to .437 in., at a production speed of 120 ft. per minute. The machine is credited with eliminating former production problems. One man, instead of two, now works on 10 to 25 ft. lengths of the tube. Since there are no guides, no



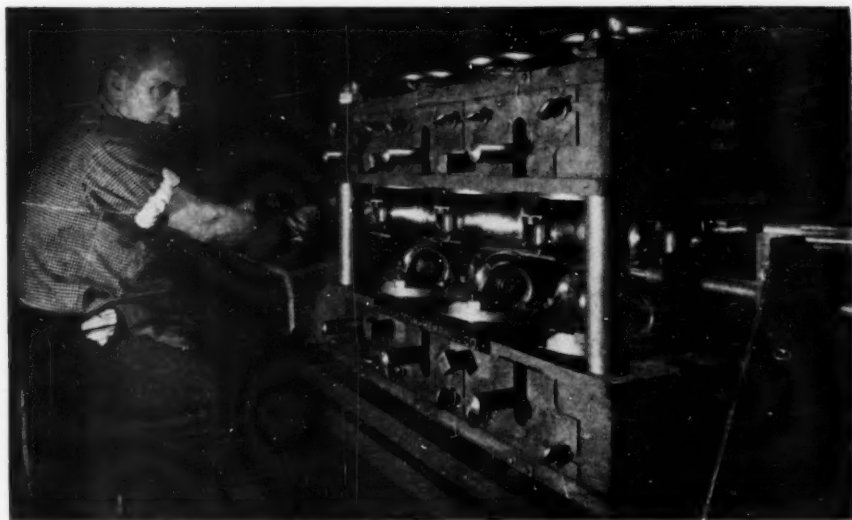
time is lost in guide-dressing, and maintenance has been at a minimum. The Summerill cold finishing mill provides tubing for fabrication into many products, such as mechanical tubing for machine and aircraft components, and high pressure diesel injector tubing.

$\frac{1}{4}$ " to $1\frac{1}{2}$ " OD, requires only 7' 10" by 5' 5" of floor area.

Some Interesting Installations

The Mackenzie-Walton Company, Pawtucket, R.I., straightens non-ferrous

seamless tubing at the rate of 120 ft. a minute. It handles 70-30 high brass, with an OD of .298", straightening 12-ft. lengths to a specification of $1/32$ " deviation per length. Another high brass tube with .400" OD in 6-ft. lengths is



Hard brass tube in diameters from $\frac{3}{8}$ to $\frac{7}{8}$ in. and copper tube from $\frac{1}{4}$ to $1\frac{1}{4}$ in. are straightened on this machine at The National Copper & Smelting Co., Cleveland. Wall thicknesses of the 12 to 20 ft. lengths vary from .020 to .125 in. This rotary straightener is also used to "skin-harden" 20 ft. lengths of $\frac{3}{8}$ in. soft copper tube with .020 in. wall. Precision adjustment of its six power-driven rolls not only removes any waves, bends or kinks, but also makes the tube $\frac{1}{4}$ hard. This protects tubing against accidental damage to straightness and roundness during handling, but permits easy bending during later fabrication.

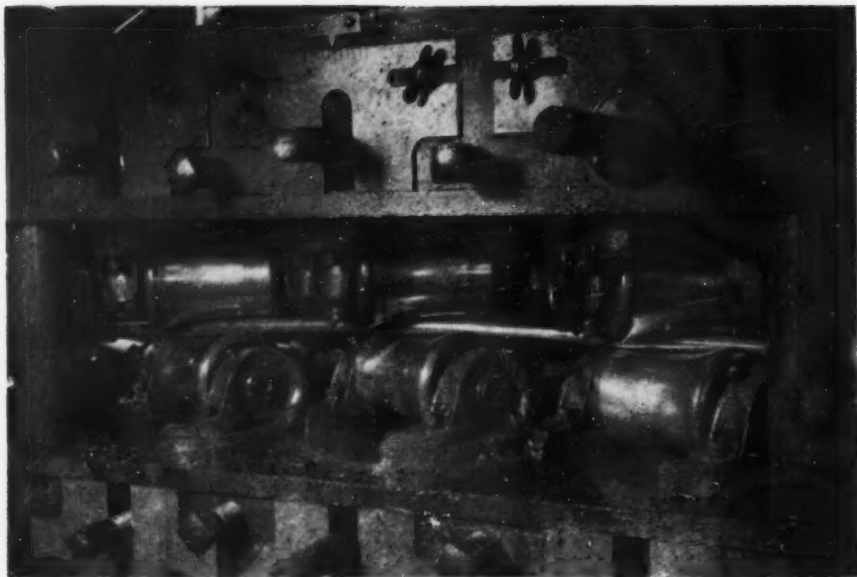
straightened to within the allowed deviation of .005" per foot.

Small Tube Products, Inc., Waterbury, Conn., expanded production facilities in 1950. Waves and bends in 20-ft. lengths of $\frac{1}{2}$ " copper and brass tubing are removed at the rate of 1,000 lengths an hour. Absolute roundness is secured. The machine works at a maximum speed of 500 ft. of tubing per minute.

Tubing produced by Precision Tube Co., Inc., North Wales, Pa., is used in various machine and aircraft components, also for high pressure diesel injectors. Tubing straightened includes monel, yellow brass, aluminum, copper, phosphor bronze, nickel-silver and

cupro-nickel. The "bow" or "sweep" created by drawing operations, which frequently amounts to as much as 4 inches in 14-ft. length, is entirely removed. Perfect roundness is maintained on all tubing, it is reported, with approximately 25,000 feet, in lengths of from 12 to 14 feet, passing through in a single shift.

At the J. Bishop & Company Platinum Works, Malvern, Pa., tubing that eventually becomes hypodermic needles, parts of atomizers, spray nozzles, fountain pens, mechanical pencils and radio equipment is produced. Tubing in sizes from $\frac{1}{4}$ " to $1\frac{1}{4}$ " meets a required straightness specifications of .020"

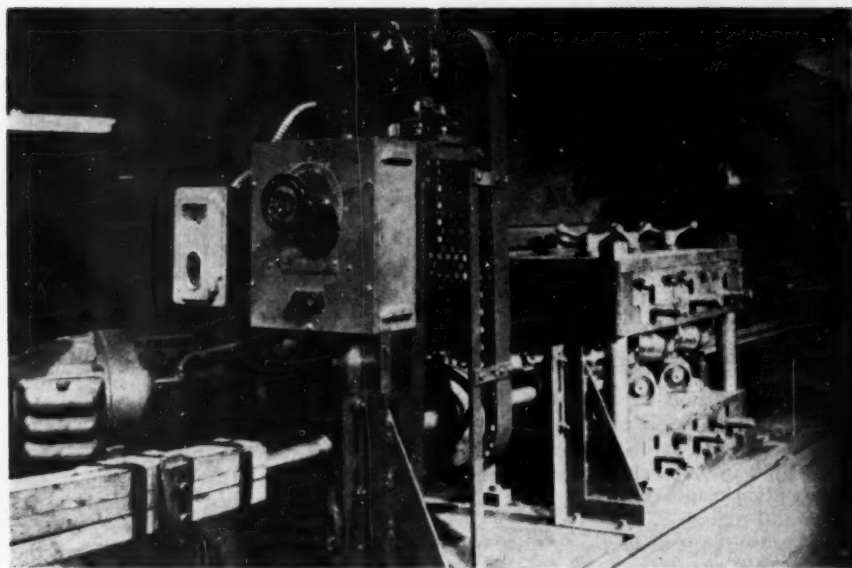


A close-up of welded steel tube straightening at Avon Tube Division of Higbie Mfg. Co., Rochester, Mich. Note that the method of straightening tube is accomplished by an offset cross-roll pass between two fixed cross-roll passes. No rubbing guides are required because the rolls are driven on both sides of the stock which is supported by the bottom rolls. With this balanced arrangement there is no decreasing efficiency from uneven wearing of the rolls. Straightening takes place from section to section and not from point to point. All six rolls are identically concaved and are so designed that each bears along its whole face on the tube to be straightened. Roll arrangement thus combines with roll shape to give two types of straightening action—complex bending and ovaling. Straining forces are applied over the entire length of the tube in the straightener.

per foot. Walls on light tubing range from .010" down to .003", with some tubing having a tensile strength up to 150,000 psi.

Some 200,000 ft. of $\frac{3}{4}$ " stainless steel tubing are straightened each month by the Grand Rapids Hardware Co., Grand Rapids, Mich. Two men operating a new straightener for about six hours a day turn out more straight tube than six men did on other equipment in

a former two-shift operation. The straightness specifications met by the machine allow .240" deviation per 20 ft. length, but Grand Rapids holds well within .125" for 16 ft. lengths and .150" per 20 ft. length. Valuable floor space formerly occupied by bulkier equipment is now utilized for other production purposes. Down-time has been reduced as the machine handles from $\frac{1}{4}$ " to $\frac{7}{8}$ " tube without changing straighten-



This "spinner" has proved to be a most effective supplement to the tube straightening equipment at Metal Forming Corp., Elkhart, Indiana. As the tubing is inserted in the wood run-in box—seen at the extreme left of the above picture—the entry end of the tube passes into a 1 in. rubber-lined steel pipe. This pipe is spun by a belt drive so it rotates at the same speed as the straightening rolls of the straightener. Thus each length of tubing rapidly spins with the 1 in. pipe while it enters the first set of straightening rolls. This method of handling alloy tubing has made possible the straightening of 250 ft. of tubing per minute, expedited the straightening operation, and has minimized the gall at the tube end from initial contact with the fast-turning first set of rolls. Both the "spinner" and the straightener have variable speed drives.

ing rolls. Rejections due to surface marking of tubes are negligible.

Nickel-chrome-alloy tubing, in diameters of from 5/16" to 1/2", in lengths of from 12 to 14 feet, is produced at the plant of Metal Forming Corp., Elkhart, Ind.

Specifications of this tubing, much of which is used in the manufacture of heating elements for electric ranges, calls for control of surface imperfections to a minimum, and for less than com-

mercial deviation from perfect straightness.

Plant engineers worked out a practical supplement for the straightener which has aided considerably in increasing production. This is, in effect, a "spinning feed" for the straightener. It consists of a wooden run-in box which has aided considerably in in-pipe that is mounted immediately ahead of the straightener. The pipe is motor driven to spin at a speed equal to that

of the straightener rolls, and pre-rotates the tube entering the machine. This method of run-in has not only expedited straightening operation, but has minimized gall effect on front end of tube that first meets the spinning rolls.

While full recognition by the tube industry has long been given to such production operations as welding, drawing and heat treating, it is evident that only recently has the allied problem of finish straightening been given the

thought and attention merited by its importance in the over-all tube production picture.

Present focus of interest on improved straightening equipment and technique will almost certainly result in continued production gains as better methods are developed in feeding tubes in and out of today's high speed rotary straightening machines.

The End

Cold Extruding Job Speeded With Tough Steels

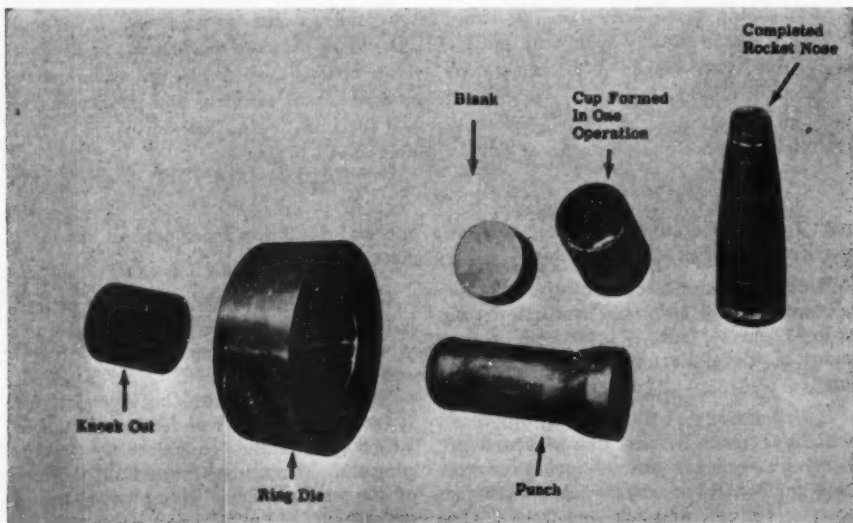
POWER extrusion, a relatively new and promising method of cold forming steel in this country, is being used successfully in a large midwestern manufacturing plant for the production of rocket projectile noses.

By power extruding—sometimes called “cold extruding” and “backward extruding”—this manufacturer was able

to lower fabricating costs as well as increase production. A significant share of this success was due to the tool and die steels used in the job.

The part described is the first operation in cold forming the nose piece. It is made from SAE 1010 steel. From the start, it was obvious that the main problem would be in the first stage of

1. The tools used in the first operation of cold forming the nose piece. Difficulty was in finding tool or die steels that could withstand the tremendous strain of the impact.



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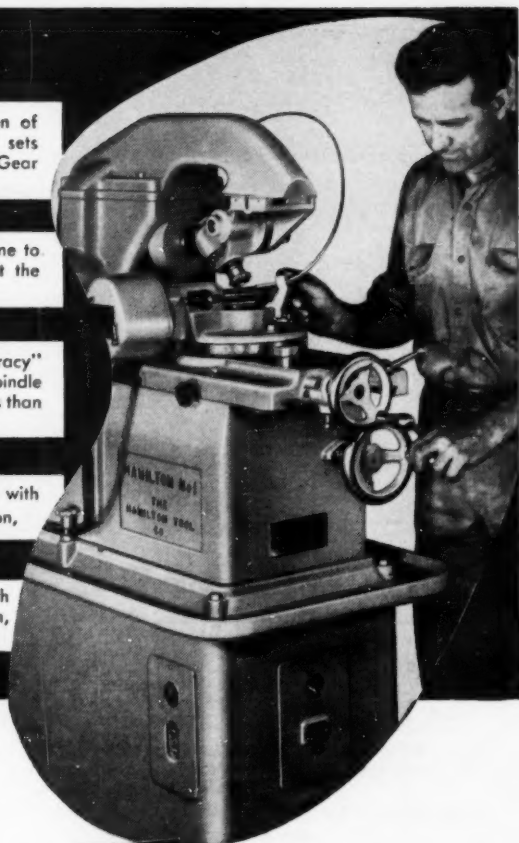
THIS FEATURE: "Independent selection of speed, feed and indexing," sets the Hamilton Precision Small Gear Hobber apart from the field,

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THIS FACT, and a "reserve of accuracy" built into the machine, work spindle and hob spindle runout of less than .0002" as an example,

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extruding the steel slug. Once that was solved, the company's engineers figured the remaining stages of manufacture would fall into a routine pattern.

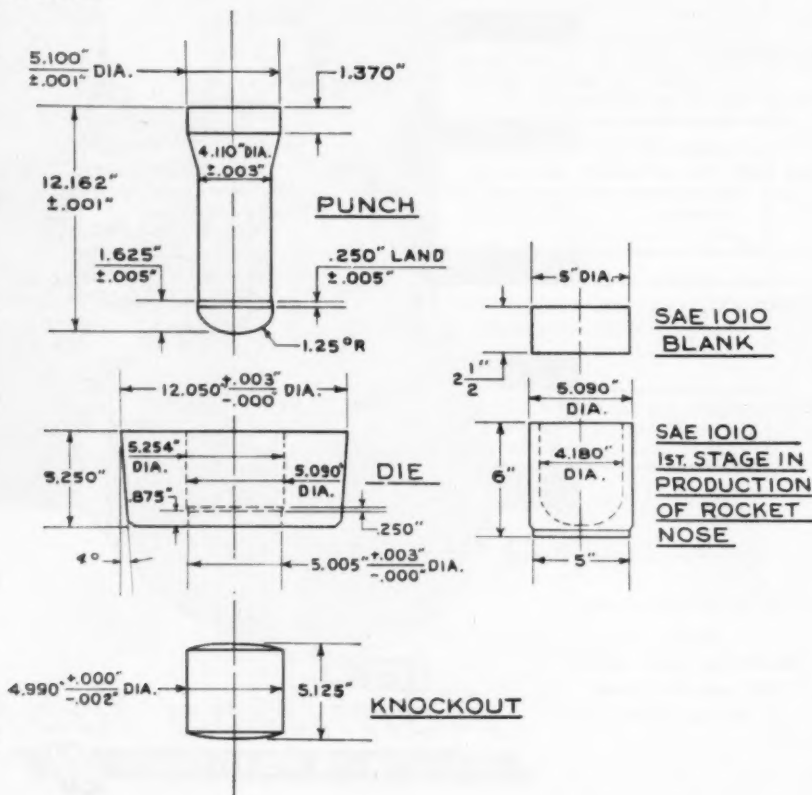
Punch Problem Solved

Finding tool or die steels that could withstand the tremendous strain of the impact was a stubborn problem in getting the job underway. Seventeen hundred tons of pressure are exerted on a 2500-ton capacity press in the first operation.

For the punch, many steels, including high speed steels, were tried. The highest production from any of them was about 3,000 pieces. The difficulty lay in the inability of the steel to stand up under this type of service without prematurely upsetting and cracking.

Finally chosen for the job was Carpenter Star-Zenith, an 18-4-1 high speed steel produced by The Carpenter Steel Company of Reading, Pa. At the last report, the Star-Zenith punch had produced more than 14,000 pieces and

2. Drawings and dimensions used in the tools for cold forming (first operation) projectile nose pieces.



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was still in operation.

Heat treatment of the punch consists of hardening in a salt bath from a temperature of 2350°F, and then double drawing at 1050°F to a hardness of Rockwell C-62/64. After drawing, the punch is given a liquid nitride treatment for five hours at 1000°F. This treatment develops a surface hardness of approximately 72/74 Rockwell-C to a depth of about .001".

The temperature developed in the punch during the extruding operation is about 500°F—and this temperature is maintained constantly. When the press is idle between shifts, the temperature is held at 500°F with a special heating jacket.

The knock-out is also made of high speed steel and treated to the same hardness as the punch.

Choosing The Ring Die Steel

Thorough investigation was also necessary in solving the problem of getting good life from the ring die. Again many different tool steels were tried with little success. The best performance from any tool steel averaged about 100 pieces.

After extensive testing, the plant decided to use Carpenter Vega, a manganese-chromium-molybdenum, non-deforming, air-hardening die steel. When last reported, the Vega ring had turned out 23,000 cups and was still in operation.

This ring is given the standard heat treatment and put into operation at a hardness of Rockwell C-58/60. There is no need for high temperature furnaces or packing. The scale flakes off the tools cleanly in air cooling. Another advantage of the steel in this application is its uniform hardness from surface to center in large sections.

In the case of steels formerly applied, failure of the ring occurred when the strain exceeded the elastic limit of the steel. Even though the ring die is press

fitted into a four-foot diameter hardened retainer ring (Rockwell C-34/36), the force exerted in the extruding operation stretches the die so that the inside diameter becomes too large for the close tolerance requirements of the cup. This must be held to .010" of specified wall thickness.

Here's an indication of the degree of cold work done in this operation. During the cold forming of the 14-lb. 6-oz. slug, the hardness of the SAE 1010 steel increases from about Rockwell B-60 to B-90. The resulting increase in mechanical properties in this and all subsequent operations meets specifications exactly and eliminates the need for final heat treatment of the finished nose.

The End



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 A detailed black and white photograph of a Hamilton Varimatic drilling machine. The machine features a heavy cast-iron base, a vertical column, and a complex head assembly with multiple spindles and a hand crank. A worktable is mounted on the column, and a small lamp is attached to the side. The machine is designed for precision drilling of small holes.

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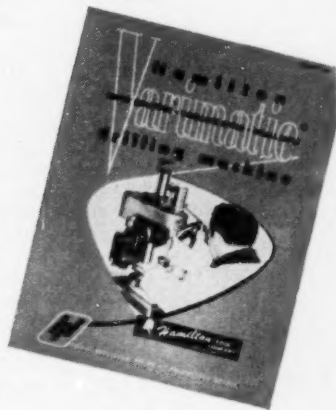
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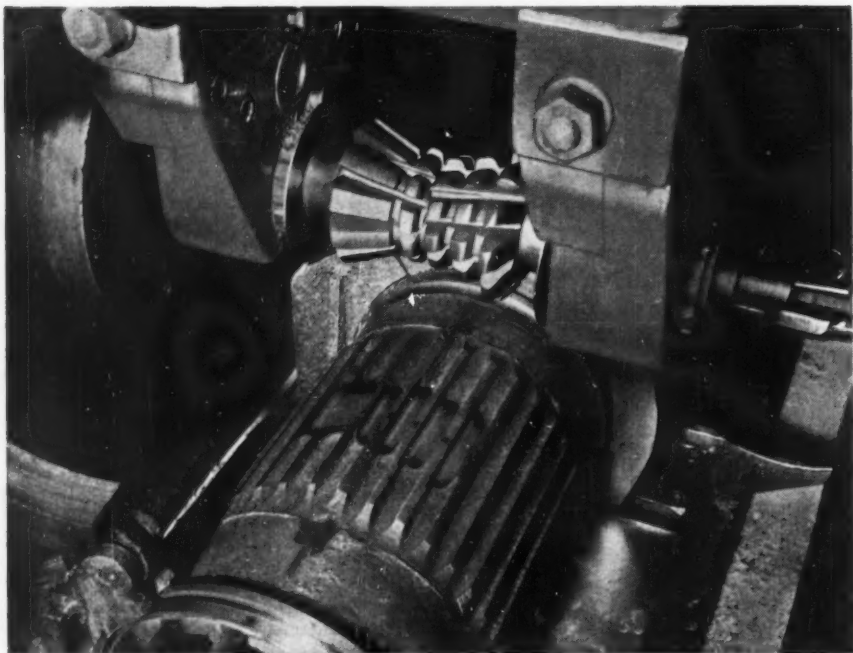
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BARBER-COLMAN FORM CUTTER DESIGN LESSENS CHATTER AND VIBRATION

Helical Teeth Provide Continuous Cutting Action

Shearing action of these Barber-Colman helical-fluted form cutters not only reduces chatter and vibration to a minimum, but also improves tool life and production on this milling job.

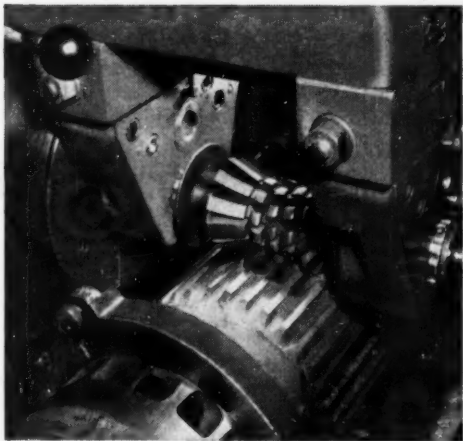
Gang-type cutters are recommended because they combine several operations in a single cut, and also because individual sections are interchangeable for other gang operations. Due to the type of cut and non-uniform material, some sections receive more wear than others and require more frequent replacement. With the gang arrangement, section replacements can be ordered singly, thereby reducing tooling costs.

Redesign of the cutters for this job included the adoption of helical teeth recommended by Barber-Colman Engineers. These helical teeth provide continuous cutting action and have eliminated chatter in the cut.

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These cylinder liners are milled on two surfaces, 180° apart, using a feed of $\frac{3}{4}$ " per minute and cutter speed of 123 RPM. Cutters are $4\frac{1}{2}$ " diameter x 5.477" overall length, with helical teeth, and are fed radially to depth. The cast-steel liners are non-uniform in structure, and frequent hard spots are encountered. Production is 5 sleeves per hour compared with 2 per hour obtained with former straight-fluted cutters. Tool life averages 35-50 pieces per sharpening, depending upon the consistency of the material. There is no evidence of chatter or rapid wear as experienced with straight-fluted cutters.



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H O B S A N D M A C H I N E S S I N C E 1 9 1 1

Increase Welding Speeds with Powdered Metal

By **L. K. Stringham**, Chief Engineer
The Lincoln Electric Company
Cleveland, Ohio

HEAVILY coated electrodes containing large quantities of powdered metal in their coatings obtain increased welding speeds on the order of 50 percent, with appearance in smoothness and freedom from spatter almost equal to that obtained with automatic welding.

The development of electrodes with powdered metal in their coatings is a milestone for metal fabricating industries. Although these electrodes are still new, cost reductions already obtained in production welding indicate that welding procedures will shortly be completely revised to new standards.

The basic fundamentals of the arc welding process have led inevitably to the development of powdered metal coatings and, therefore, inevitably secure their position in welding progress.

In general, as welding current increases, the speed of welding increases. The electric arc drawn from the end of a welding electrode performs the three functions of melting the core wire, melting the coating of the electrode, and melting the edges of the

parts to be welded together. An increase in welding current increases the speed with which the arc can perform these functions. For any given size electrode, welding speeds can be increased until a maximum usable current is reached. Beyond this maximum current a further increase causes difficulties which result in unsatisfactory operation. The difficulty may be an overheated electrode causing a breakdown of the coating, it may be too much penetration, gouging of the parent metal or too much spatter. In any case, the effect is to impose the top limit on welding speed.

Electrodes with powdered metal coatings are designed to raise this top limit on welding speeds by eliminating or reducing the effect of these difficulties.

The major cause of operating difficulties that limit welding speeds is the fact that the welding arc normally creates more heat than can be effectively used by conventional electrodes in melting the parent metal, the core wire and the coating. This excess heat

usually is expended in melting an excessive amount of parent metal. The arc force throws this excess and some of the melted core wire out of the molten pool. The result, depending on the application, may be too much penetration, gouging, undercutting and spatter. The correction for the difficulty with conventional electrodes is, of

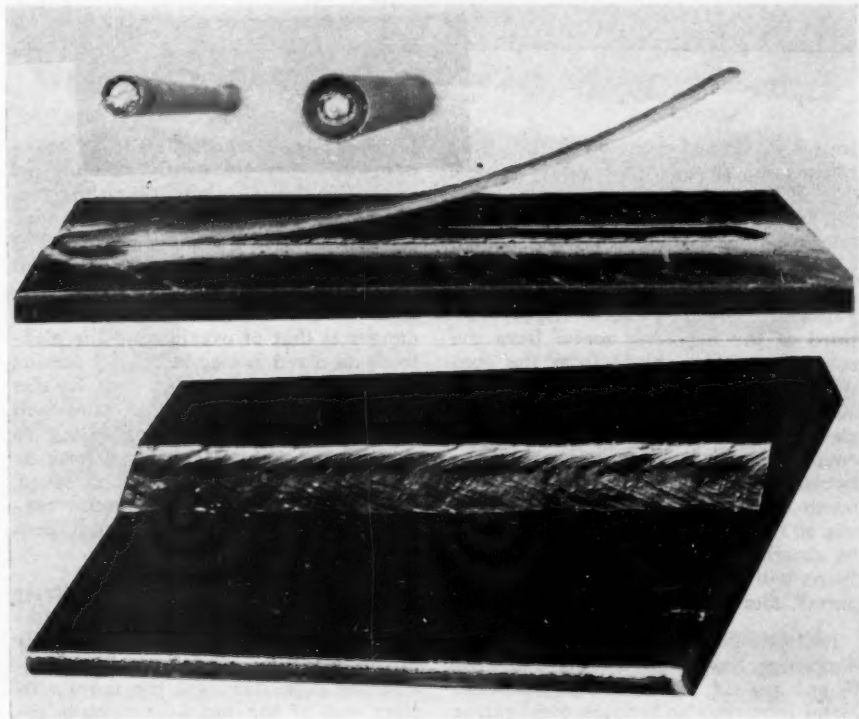
course, to cut back on the amount of current used and slow up welding speeds until satisfactory operation is obtained.

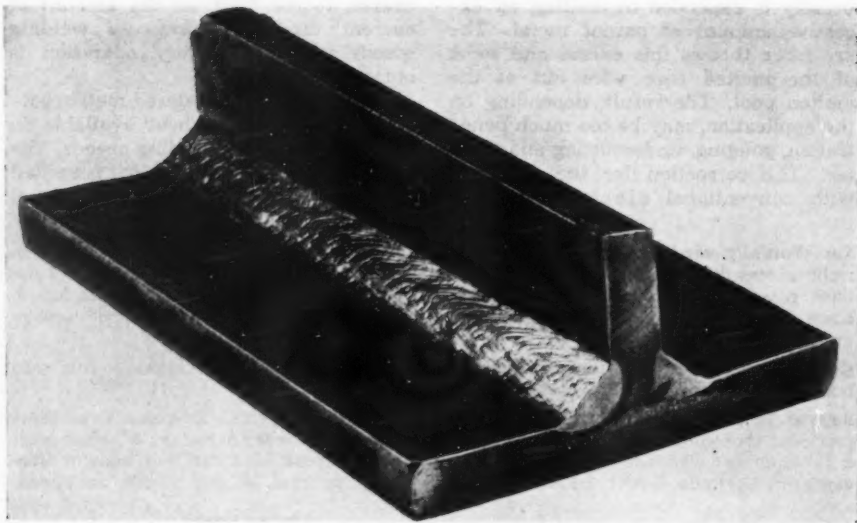
Electrodes with powdered metal coatings use the excess heat available in the arc to increase welding speeds. The powdered metal in the coating is melted by this heat and becomes an additional

Top: Partially used conventional electrode, left; electrode with powdered metal coating, right; shows difference in thickness of coatings and how crucible forms in the end of the thick powdered metal coating. This gives automatic control of mechanical arc length since drag technique is used in operation and controls arc action to give a smooth steady arc.

Center: Slag formed from powdered metal coating is practically self-cleaning. This slag has lifted from the bead by itself as it cooled.

Bottom: Powdered metal coatings produce smooth, clean welds, comparable to those produced with automatic welding. This is a horizontal lap weld made in $\frac{1}{4}$ " plate with a $\frac{1}{4}$ " diameter electrode. Current is 360 amperes, arc speed 18 inches per minute! Conventional electrode, E-6012, calls for 320 amperes current and 12" per minute arc speed.





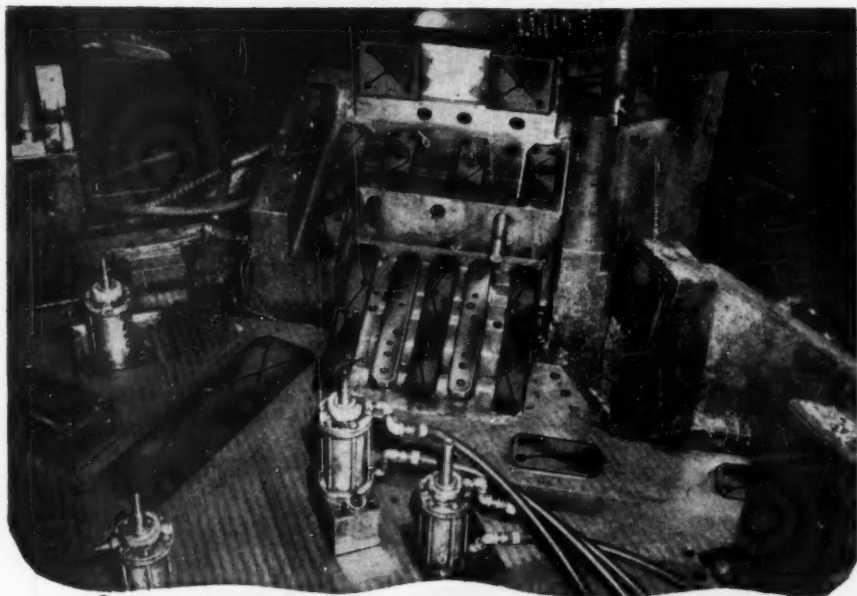
Horizontal fillet weld, plate size $\frac{3}{8}$ ", fillet size $\frac{5}{16}$ ", electrode size $\frac{1}{4}$ ". Current was 360 amperes, arc speed 14 inches per minute.

source of metal for the weld, thus permitting an increase in welding speeds. The difficulties of excess current, spatter, gouging, undercutting are minimized and additional metal is available to make full welds at the higher speeds. If an electrode contains sufficient iron powder in the coating to supply one third of the deposited metal from the coating and two thirds from the core wire, that electrode can deposit metal 50 percent faster than the same size electrode without iron powder in the coating. Proper balance is necessary between coating and core wire, for if too much iron powder is put into the coating, so much of the heat of the arc may be absorbed by melting the coating that there will not be enough to melt the parent metal and core wire.

In addition to reducing spatter, undercutting and gouging, this more efficient use of arc heat by powdered metal coatings also reduces overheating

in electrodes. Overheating is an operating difficulty frequently encountered on welding applications where the rate of metal deposition is the only controlling factor on welding speeds. The temptation is to push welding current up to its maximum since current controls the rate of metal deposition. The danger is that of overheating the electrode to a red hot condition by forcing it to carry more current than its size warrants. A red hot core wire will break down the electrode coating so that it cannot satisfactorily perform its functions. The limit to welding speed, therefore, becomes the maximum current which can be used without producing a red hot core wire.

Powdered metal electrodes effectively raise the limit on welding speeds imposed by the current carrying capacity of the core wire. More metal is available for deposition and the more efficient use of the arc heat permits in-



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Typical Currents and Speeds

Electrode Size	Current Amps	Polarity	Fillet Size	Arc Speed Inches/Minutes
5/32"	225	AC	7/32"	15
5/32"	200	DC (+)	7/32"	12.5
3/16"	275	AC	1/4"	15
3/16"	250	DC (+)	1/4"	12.5
7/32"	300	AC	9/32"	15
7/32"	270	DC (+)	9/32"	12.5
1/4"	350	AC	5/16"	14
1/4"	300	DC (+)	5/16"	12

creasing welding speeds without necessarily increasing currents.

For the electrode consumer, the efficient use of arc heat by powdered metal coatings means:

1. Lower welding costs through higher

welding speeds.

2. Lower cleaning costs because of less spatter and undercut.

3. Smoother and more uniform welds.

The End.

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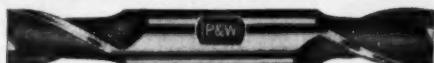
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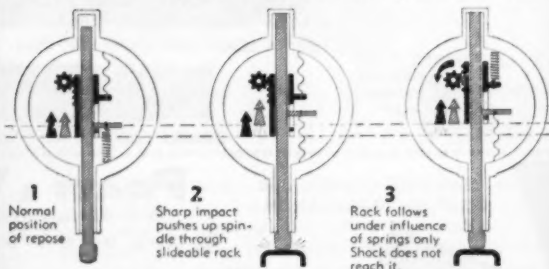
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Simple Tricks To Use With Lathes

By **Tom Brown**, Consulting Tool Engineer

Simple Spherical Turning Device

THIS SPHERICAL turning device consists of nothing more than a steel rod with each end turned to a point. It is shown on the left of the photograph. The distance between the points is equal to the radius to be turned on the work. The rod is inserted into a small center punch mark made in the vertical faces of the cross slide casting and tailstock. If the rod is retained in contact with the two castings by applying hand pressure by means of the saddle crank, traversing of the cross slide will cause the cutting tool point to travel through an arc whose radius will equal that of the pointed pin's length.

Accurate results can be obtained with this simple device if a few precautions are observed, the main one being that when the tool point is exactly in line with the work axis, the pointed pin's axis should be parallel with the lathe bed slides both in the vertical and the horizontal plane. If the compound slide

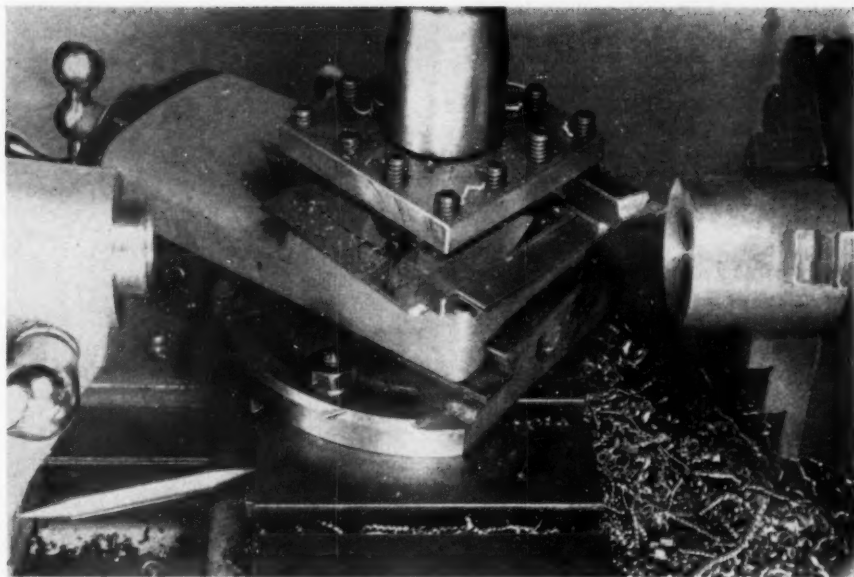
rest can be swivelled at a right angle to the cross slide travel, increments of cut can be applied with it.

Only part-spherical surfaces of fairly large radius can be produced by this method but it has uses where such things as self-aligning spherical seatings are needed in general tool and repair work.

The setup illustrated is suitable for producing concave spherical surfaces. Corresponding convex surfaces can be machined by bolting some form of support to the bed at the headstock side of the saddle to take the place of the tailstock casting. The one pointed pin can be used for both concave and convex and a perfectly matched pair will be produced.

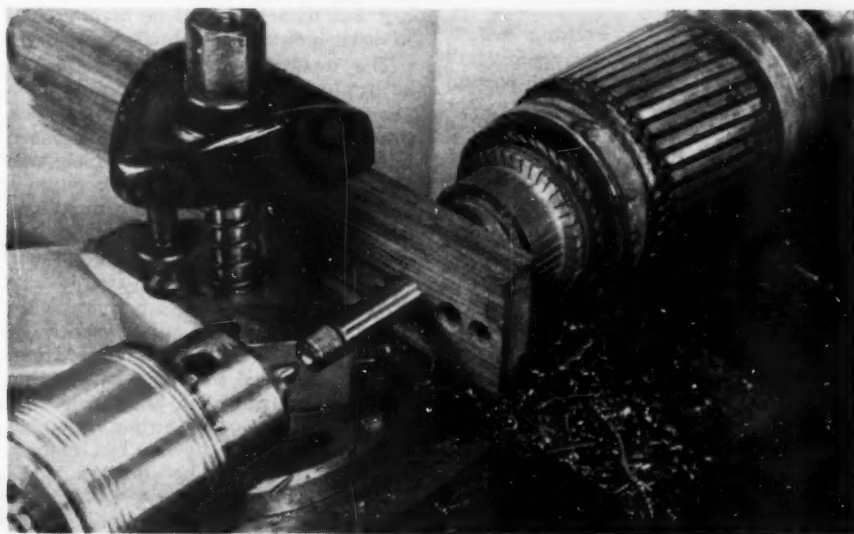
Wooden Steady for Centering

In the repair and maintenance of electric motors, it is often necessary to renew the centers in the ends of the rotor shaft. The centers become damaged and distorted by the use of pulley-



1. Simple spherical turning device. Note the pointed steel rod in the lower left hand corner.

2. A wooden steady rest for centering ends of rotor shafts, etc.



drawers and ball-race pullers, but they are best used for mounting the rotor in the lathe for skimming the commutator and for correcting unbalance.

Center holes in the shaft end should be concentric with the actual bearing portion, or that part where the inner race of the ball race fits. Rotors should, accordingly, be supported in a steady rest in order to true up the centers. The jog will be speeded considerably if the wooden steady rest illustrated were used instead of the normal lathe steady which takes a considerable length of time to mount on the lathe and to set for the work diameter.

The wooden steady comprises a length of hardwood mounted in the lathe tool post. A hole can be drilled in a diameter to suit the motor shaft by mounting a drill in a chuck in the lathe spindle and feeding the wooden rest to it by means of the saddle traverse. The steady can be used repeatedly if care is taken to place it with one definite side up whenever it is mounted in the tool post. A series of holes to suit different work diameters can be drilled and can be used for all centering of small diameter rods.

When renewing an existing center, such as a motor spindle, a center drill with the small diameter pilot portion broken off is best; it will tend to cut the hole cleanly instead of following the old surface of the center. After the initial truing with the broken center drill, a new and complete one can be substituted to finish off the hole.

The wooden steady has the advantages of quick positioning and will always ensure true running of the work supported in it.

Increasing Speed of Chuck Changing

For loosening the chuck thread engagement with a lathe, or other form of spindle, it is often recommended that the chuck key be inserted in a pinion hole and given a blow with a hammer. This is bad for the pinion key holes



3. Using a wrench to loosen a chuck.

and may often break or bend the key. It is inefficient because two items, the key and hammer, must be manipulated in order to loosen the chuck.

The method illustrated requires an adjustable wrench only. The wrench jaws are set to thickness of one chuck jaw and are applied thereto. A sharp jerk on the end of the wrench will loosen the chuck on the spindle without straining or damaging anything. The machine spindle must be locked immovably before the wrench is applied.

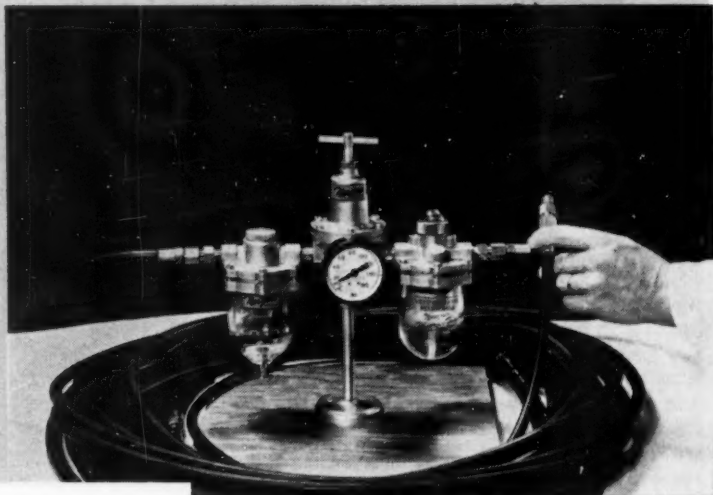
The same idea can be used on chucks up to 8 in. body diameter. For bigger chucks, a standard solid wrench of suitable jaw opening can be used and may be extended in length by welding on an extra piece of bar steel. This method is much quicker than reversing the spindle under power and placing a block on the lathe bed for one of the jaws to hit.

Cleaning out chuck back plate threads

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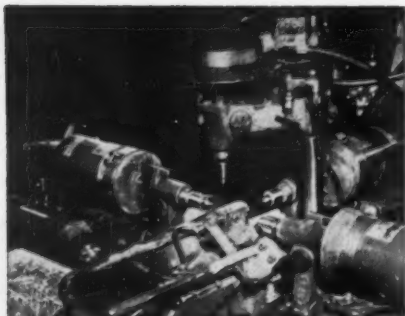
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HOW TO DRILL SMALL HOLES ACCURATELY ON A PRODUCTION BASIS

Pictured above is an E-M drill head setup that has been used for years in a large gasoline engine manufacturing plant. Operation starts automatically when the piece is clamped in place. Three cross holes are then drilled followed by a fourth axial drill to size and deburr. Hole sizes range from No. 60 to 50. One man completes all operations at once whereas four separate operations were required before E-M automatic drill heads were used. Production and quality are way up, and stay up year after year.

Perhaps you have a similar operation in your plant that is adaptable to faster, more efficient E-M automatic drilling. There is no obligation for our engineering service.

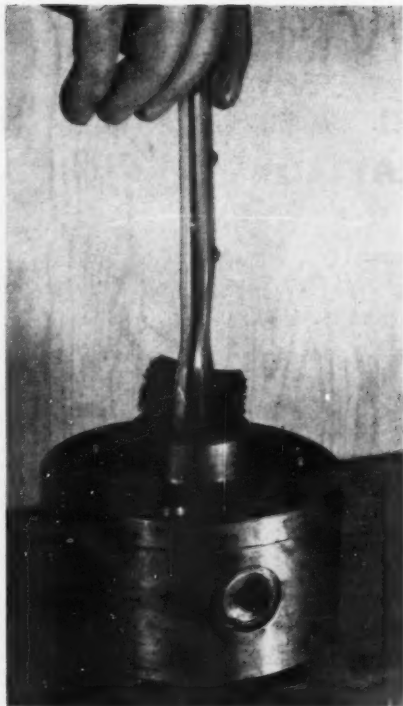
The outstanding features of the E-M automatic drill heads listed below, can cut your small hole drillings costs to a minimum:

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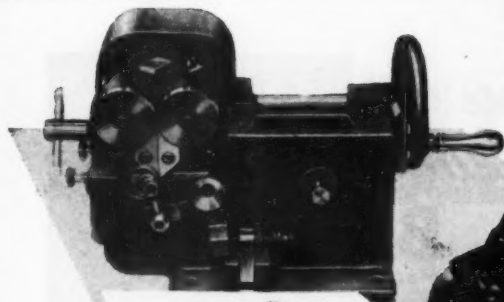


4. Two toothbrushes, screwed together, will clean threads on chucks.

can often be a prolonged operation but they must be free of grit if damage to screwed spindle noses is to be avoided.

An efficient cleaning tool for small diameter screwed back plates can be made from a pair of tooth brushes screwed together to form a single unit double-sided brush. This brush is screwed through the threaded hole in the chuck back plate and takes with it all the dirt. If dipped in kerosene, the cleaning operation will be more thorough. The brush should be screwed right through the chuck body and withdrawn from the jaw side. If the dirty brush is pulled back up through the threaded hole, some of the particles will be redeposited on the clean threads.

The End



Hand-operated model for tool-rooms, maintenance work or research labs. Approved and used by the Armed Services.

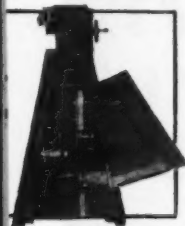


Only 7" high (lowest in the trade), **OMNI-VISE #4**, shown here, is tough, weighs 74 lbs. Jaws are 4"x1½", open to 4". Base is 9" in diameter one side straight.

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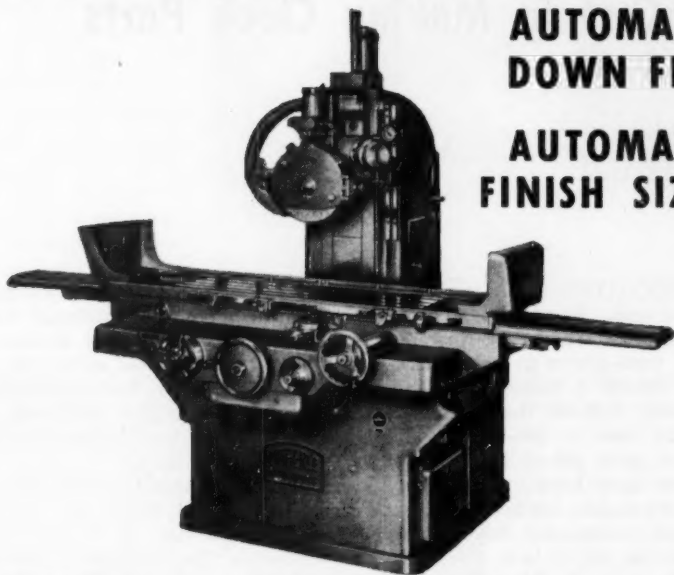
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Pre-Coated Metal Coil Saves Time, Cuts Cost in Making Clock Parts

BY FABRICATING clock parts from pre-coated coil, Weedsport Manufacturing Company, Weedsport, New York, makes its time-pieces in less time.

In fact, Joseph J. Solon, president of the company, believes that the savings effected by use of pre-coated metal has helped meet prices in the highly competitive clock field.

Weedsport makes kitchen clocks and combination refrigerator defrosters and kitchen clocks which bear the famous Poole trade name. It also makes mantle clocks.

Among the advantages which the use of pre-coated metal coil has given Weedsport, Solon lists the following:

Cuts in manufacturing costs of some parts ranging from 30 to 35 percent.

Elimination of the firm's paint shop, with attendant reductions in operating costs, insurance premiums, overhead costs, and danger from paint fumes and fire.

Increased color appeal in the finished product.

Improved quality in parts where used.

Supplied by Enamelstrip Corporation, Allentown, Pa., the material was first used by Weedsport for making clock dials. The pre-coated metal coil proved so satisfactory in this application that soon it was specified for bezels, sweep second hands, back support panels and gear train housing.

In the production of clock dials alone, Weedsport cut costs by 50 percent through the use of Enamelstrip coil. Previously, the dials were made by two methods:

- 1 Printed paper dials were glued by hand on plated metal supports.
- 2 Dials were blanked from bare metal, then coated on both sides with white paint, and finally silk screened.

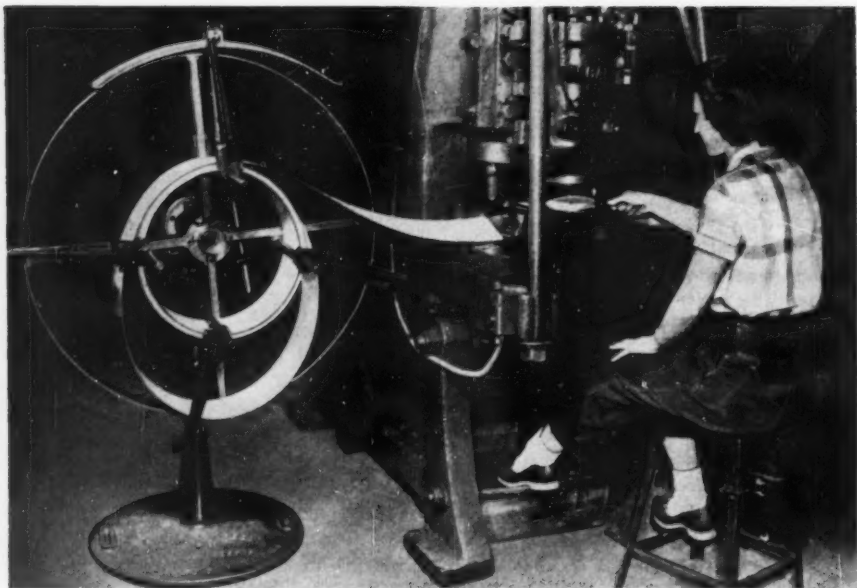
In both methods, the first step was to shear strips from bare metal sheets, stack and transport to the presses for blanking. The handling required, as well as a five percent scrap loss, contributed to overall production costs.

The third method tried was to blank the dials from Enamelstrip pre-coated metal coil. The dial blanks were then

Prior to using pre-coated metal coil in the manufacture of clock dials, Weedsport Manufacturing Corporation had glued printed paper dials on a plated metal support, a time-consuming operation with a fairly high rejection rate. Another method was to paint bare metal blanks, then silk screen them. Both methods were supplanted by the faster, less costly process of blanking from pre-coated coil, then silk screening.



These clock parts are now made economically from pre-coated metal coil. Left to right, they are: dial blank (front) and dial after silk screening; bezels front and back plates for gear train assembly; back support panel. Parts leave the press ready for assembly, except for dials, which are silk screened.



Coil is fed directly into the press (Weedsport had previously sheared strips from bare metal sheets) and blanks are then ready to silk screen. Coating is self-lubricating so that no degreasing is necessary.

silk screened with no intervening process. This method proved so much better than the other two that it is now used exclusively at the Weedsport plant.

Supplied to the correct width, the coil is fed directly into the press by the operator, thereby eliminating shearing, stacking and transporting strips. The five percent scrap loss with sheets was reduced to two percent by the use of coil—a scrap saving of 60 percent.

When paper dials were glued to plated metal supports, rejects were high no matter how fastidious the hand work. Use of Enamelstrip reduced the reject rate to virtually zero.

Whether the metal blanks were plated (when used as supports for the paper dials), or painted (for subse-

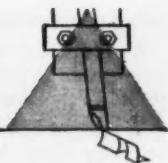
quent silk screening), they had to be degreased before a finish could be applied. Enamelstrip not only has made it unnecessary to either plate or paint but, because the coating on the coil is self lubricating, no degreasing is required after the blanking operation.

At one time, Weedsport used their paint shop for painting dials and for painting parts of the signal gear train for the clock defroster. Use of pre-coated material in these applications has made it possible to discontinue the paint shop.

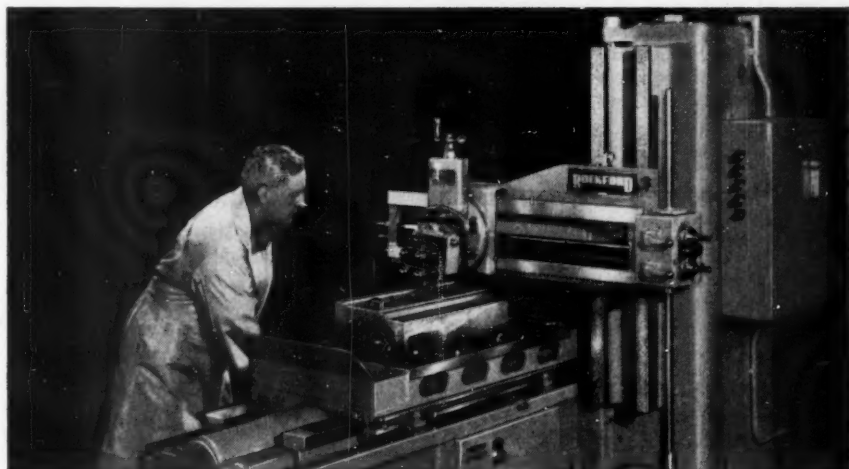
Cases for Poole kitchen clocks and defroster clocks come in three colors—white, red and yellow. When Weedsport began making clock bezels from pre-coated coil, they selected the same three colors, permitting use of either contrasting or harmonizing colored be-

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zels for appealing color combinations.

Sweep second hands are fabricated from either red or black, dials from white pre-coated metal.

Weedsport purchases coil pre-finished on both sides for maximum protection against corrosion. Where rusting or corrosion are not important, the material can be furnished with a coating on one side only.

The savings from increased production when using automatic coil feeds is invariably augmented by lower scrap loss. With strips cut from sheets, scrap is lost at each end of the strip. With Enamelstrip this loss is confined to the beginning and end of the long coil. Furthermore, strips sheared from sheets do not always cut out evenly. This adds to the scrap loss.

For the fabricator who has been using bare metal in his operations, the switch to pre-coated coil stock may either eliminate the paint shop entirely (as at Weedsport) or it can take care of seasonal or one-shot orders without the need to expand facilities or to job out parts to be painted.

Where fabricators have been marketing uncoated metal parts to hold down costs, the use of colorful pre-finished metal can stimulate sales without adding greatly to production costs.

Pre-coated coil is furnished in widths from 7/32 to 30 inches, and in thicknesses ranging from .006 to .040 of an inch. Base metal can be steel (cold-rolled, electro zinc bond or tin plate), brass, zinc, aluminum, or any other base material which will take a coating.

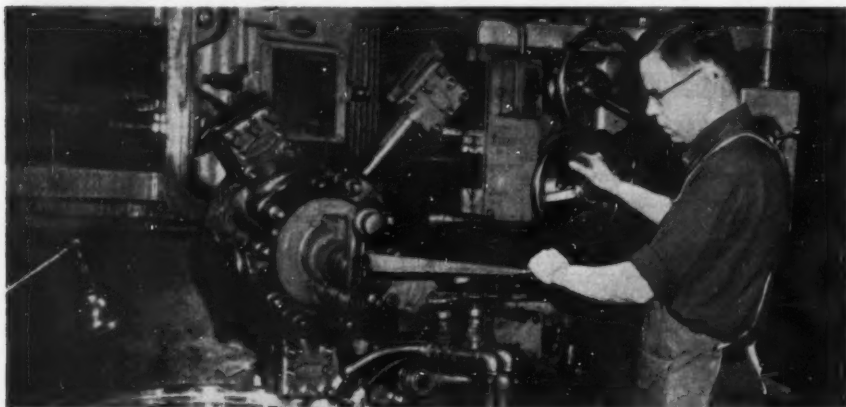
The End

Tool Life Increased When Machining Timken Alloy

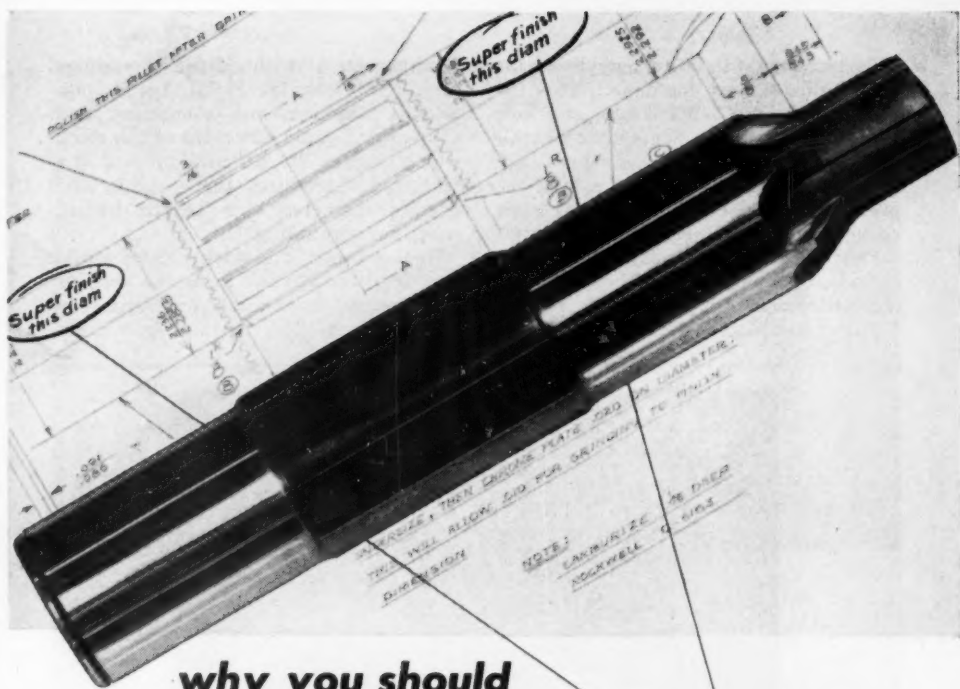
A SHIFT of carbide cutting tools in machining Timken alloy rims of jet engine turbine wheels at the Lynn River Works of General Electric Company recently paid off three ways. It reduced down time by two thirds, in-

creased tool life 300 per cent and reduced tool breakage.

Previously the operation, consisting of a turning and boring operation of both inside and outside diameters, then facing, required the use of a new car-



Overall view showing turning of Timken alloy. cold-forged steel turbine-wheel rim for jet aircraft at the Lynn River Works of General Electric Company. Heavy-duty, steel cutting carbide used here reduces down time by two thirds.



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bide tool every time an outside or inside diameter was completed. This involved frequent tool changes and new setups. Furthermore, some 30 to 40 tools hit the scrap heap due to breakage. Even in boring, the attrition rate of the previously used carbide tool was high, since it lasted through only one cut.

Shifting to a heavy-duty steel cutting carbide, Carboloy grade 370, the picture changed considerably.

The work is cold worked, forged

Timken steel with Brinell readings ranging between 269 to 321. Yet in spite of this hardness and toughness, and the varying grain structure of the steel, which makes it difficult to cut, the cutting tip produces three inside and outside diameter cuts before being ready for regrinding.

In this setup, the work rotates while the tools for cutting both the outside and inside diameters simultaneously remain fixed. The cutting tools used


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are provided with a 15-degree lead angle, 1/8-inch radius and a chip breaker.

The work revolves at a speed of 20.2 rpm with the tools set at 0.010-inch feed, the depth of cut varying from 1/2 to 3/4-inch. Tool travel at the cutting surface is about 160 sfpm on the outside diameter, and 110 sfpm on the inside diameter. Both cutting areas are flooded with a water soluble coolant.

Since all tools here are used to make heavy interrupted cuts up to 3/8-inch in depth, they are supplied with a sand-wich braze except when boring. The tool for the latter is brazed in the conventional manner. In all operations, turning, boring and facing, a 36-inch Bullard powered with a 50-hp motor is involved.

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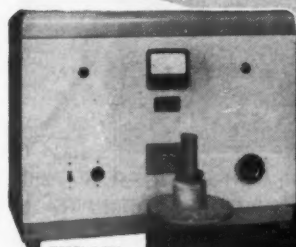
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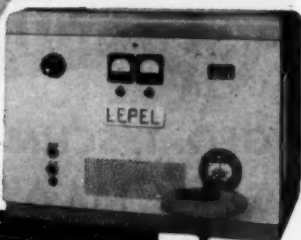
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- Production Heating of small parts
- Research Laboratories
- Tool Rooms
- Machine Shops
- Educational Institutions



MODEL T-200-1
Electronic Tube
Generator

\$1620.

f.o.b. factory



MODEL T-1
Electronic Tube
Generator

\$885.

f.o.b. factory

The Lepel line of induction heating units represents the most advanced thought in the field of electronics as well as the most practical and efficient source of heat yet developed for industrial heating. With a background of half a century of pioneering electrical and metallurgical experience, the name Lepel has become the symbol of induction heating equipment embodying the highest standards of engineering achievement, dependable low cost operation and safety.

Amazing in its speed, Lepel equipment reduces the time required for hardening, annealing, stress relieving, brazing, soldering and melting from minutes to seconds. It performs these operations with a degree of precision and uniformity rarely attained through other processes.

LEPEL Electronic Tube GENERATORS available from 1 kw to 100 kw.

LEPEL Spark Gap CONVERTERS available from 2 kw to 30 kw.

WRITE FOR THE NEW LEPEL CATALOG . . . 36 illustrated pages packed with valuable information on high frequency induction heating.

BRAZING

Permits widest choice of alloys or copper per brazing point. Ideal for brazing carbide tips.

HARDENING

Heat localized exactly where wanted at desired temperature. Ideal for gears, cams, bearing surfaces, cutting tools and other areas that are subject to wear.

SOLDERING

Speedily and neatly performs intricate soldering applications without the use of pre-formed rings.

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Ideal for annealing, stress-relieving, normalizing or pre-heating selected areas.

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Readily melts quantities of ferrous and non-ferrous metals in either graphite or ceramic crucibles.

All Lepel equipment is certified to comply with the requirements of the Federal Communications Commission.

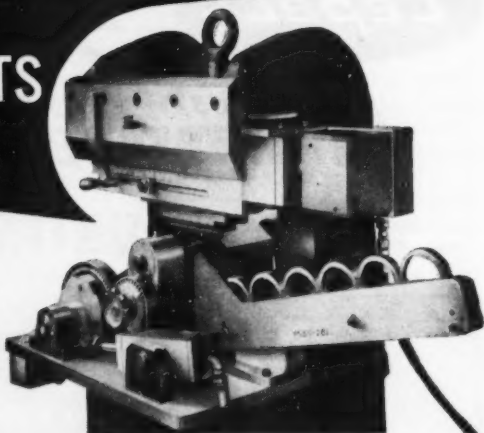
LEPEL HIGH FREQUENCY LABORATORIES, INC.


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YOU CAN CUT MARKING COSTS WITH...



GEO. T. SCHMIDT AUTOMATIC FEEDS



In many applications, thousands of components per hour are marked, with  automatic marking equipment. Feeding mechanisms are designed for a specific operation, custom tailored to suit your requirements.

Perhaps  specialists can design automatic equipment to solve your marking problems.

A trained marking engineer is at your disposal to help you modernize your marking operations and cut costs to a minimum.



Model 175 Hydraulic



The unit illustrated above marks the periphery of bearing races at the rate of 2400 to 3000 per hour. It is fed directly from automatic screw machines, and requires no operator.

IF IT'S WORTH MAKING, IT'S WORTH MARKING.

GEO. T. SCHMIDT, INC.

1802 Belle Plaine Avenue
Chicago 13, Illinois

Troubles Encountered With Tools Most Commonly Used In Cutting Stainless Steel

TURNING TOOL TROUBLES

Tools Heat and Burn

1. Turning tools may not be heavy enough.
2. They may be ground to resist cutting by not having the proper clearance and rake angle.
3. Tools may not have sufficient coolant at the right place or it may not be the proper coolant.
4. Tools may be too soft or have a decarburized surface which dulls fast and causes heating.

Cutting Edges Break Down

1. Tools may be ground too rough by using too coarse a grinding wheel.
2. Tools may be ground too thin, without proper cutting edge support.
3. Too much feed.
4. Tools too soft—decarburized surface.

Build-up on Cutting Edge

1. Top rake angle may not be sufficient.
2. Not enough feed to keep build-up from forming.
3. Tools not ground smoothly enough as a roughly ground surface will resist chip slide and the built-up edge will have a chance to form.
4. The material that is being cut may be extremely soft.
5. Improper coolant or coolant not applied correctly.
6. Not enough speed.

Poor Surface Finish

1. The material that is being cut may be too soft.
2. Surface feet may be too slow.
3. Not enough or too heavy feed.
4. Loose spindles.
5. Too much end play in spindles.
6. Loose tool holders or tool slides.
7. Improperly ground tools.
8. Improper coolant or coolant not applied correctly.
9. Grain structure of material being cut.
10. Inclusions in steel.
11. Dull tools.
12. Tools ground rough.

Cannot Hold Close Dimensions

1. Feed too heavy.
2. Too much dwell.
3. Loose spindles or end play.
4. Loose tool holders or carriers.
5. Tools not ground properly.
6. Tools not sharp.
7. Dimensions too close to hold by production turning.
8. Parts get too hot while turning.
9. Improper coolant or not sufficient coolant at right places.

Tool Drags

1. Tool holders warped or pounded out of shape.
2. Tools not ground with proper rake and clearances.
3. Tools cutting above center.

Work Hardened Surface

1. Tools cutting above center.
2. Dull tools.
3. Low feed.
4. Insufficient rake and clearances.
5. Loose holders.
6. Lands too wide.

Tools Dig

1. Tools cutting below center.
2. Not sufficient rake or clearance angles.
3. Hard and soft spots within the material being cut.
4. Loose spindles or end play.
5. Loose tool holders.

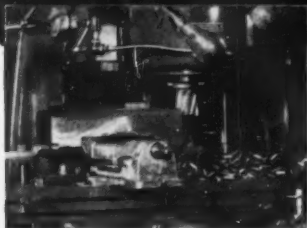
FORM TOOL TROUBLES

Tools Gall and Bind and Wear on Sides

1. Circular form tools which do not have any side clearances are the worst offenders, especially in deep forming.
2. Loose spindles or end play.
3. Worn out holders which do not hold tools squarely.
4. Soft material.
5. Insufficient feed.

A new twist in milling cutter design...

removes metal 3 to 10 times faster!
gives finishes of 20 rms and better!



Proof of "Helicarb" efficiency!

A 3" "Helicarb" straight shank end mill on a 50 h.p. mill removed 61½ cubic inches of 2340 nickel alloy steel (Rockwell C28) per minute! Spindle speed 416 r.p.m.; table speed 19" per minute; cut depth 1-5/32".

Ask your authorized industrial distributor for prices and sizes.

The new Sonnet Helicarb Milling Cutters combine the edge hardness of one-piece carbide tips with the proven principle of a true helix flute design. Result? A rugged, heavy duty cutter unmatched for stock removal and efficiency!

The constant included cutting angle of the "Helicarb" cutter distributes the cutting load uniformly over the full length of the cutting edge. Under proper conditions, this unique shearing cutting action reduces impact and gives 3 to 10 times greater production than possible with helical flute high speed steel, or straight tooth, carbide-tipped cutters. Uniform chip load and proper chip flow result in longer cutter and carbide life, less chatter, minimum chip recutting and smoother finishes—20 rms and better on actual production jobs!



Slab Mills



Shell-End Mills



End Mills



HELICAL CARBIDE MILLING CUTTERS

Sonnet Tool and Mfg. Co., 576 No. Prairie Avenue, Hawthorne, California

6. Improper coolants and not applied correctly.
7. Tools too soft—decarburation.

Cannot Hold Dimensions

1. Loose spindles.
2. Too much dwell.
3. Dull tools.
4. Soft material.
5. Loose tool holders.
6. Too much feed.
7. Dimensions too close to hold on production machines.

Tools Burn

1. Tools lack sufficient rake and clearances.
2. Too much speed.
3. Improper coolant or coolant not applied correctly.
4. Not enough feed.
5. Material too hard or too soft.
6. Tools too dull.
7. Soft tools—decarburation.

Excessive Tool Wear

1. Material highly abrasive.
2. Not enough feed.
3. Not enough or too much speed.
4. Improper coolant or not applied correctly.
5. Soft tools—decarburation.

Chatter Marks

1. Tools too sharp.
2. Loose spindles.
3. Too wide a cut.
4. Improper coolant or coolant not applied with sufficient pressure.
5. Loose tools.
6. Tools cutting below center.
7. Feeds too light.
8. Too much speed.
9. Soft material.

DRILLING AND TAPPING TROUBLES

Drills Break

1. Drills too long.
2. Dull drills.
3. Not enough clearance.
4. Too much speed.
5. Too much feed.
6. Loose drills.
7. Drills binding in hole especially on soft material.

8. Margin or land too wide.
9. Drills and material get too hot.
10. Improper coolant or coolant not applied correctly.
11. Drills do not line up.
12. Drills hit too hard.

Drills Break Up Center

1. Lack of lip clearance.
2. Heel not properly backed off.
3. Too much feed.

Drills Wear Down Rapidly

1. Tools too soft—decarburation.
2. Try nitriding or hard chrome plate.
3. Feed too light.
4. Too much speed.
5. Improper coolant or coolant not applied correctly.
6. Material too soft or too hard.
7. Material highly abrasive.
8. Drills do not line up.

Machine Ground Drills

1. Not backed off properly.
2. Web too wide.

Rough Finish

1. Soft material.
2. "Bugs" on land or margin.
3. Too much feed.
4. Loose spindles.
5. Soft drills—decarburation.
6. Improper coolant or coolant not applied correctly.
7. Poor chip elimination.
8. Too much twist in drills.
9. Loose spindles.
10. Loose drills.
11. Slow speed.

Drills Chipping or Breaking Down on Cutting Edge

1. Too much lip clearance.
2. Heel backed off too much.
3. Too much speed.
4. Too much feed.
5. Improper chip elimination.
6. Stopping machine while feed is on.
7. Material too hard or too soft.

Drills Squeak

1. Improper coolant or coolant not applied correctly.
2. Drills not lined up properly.
3. Material too hard.

4. Too much spindle speed.
5. Not enough feed.
6. Lands or margin too wide or worn away completely.
7. "Bugs" forming on margin.
8. Drills are too dull.

Tapped Hole Too Big

1. Oversize tap.
2. Wrong type of tap—Commercial or Precision.
3. Hole to be tapped too large.
4. "Bugs" on teeth.

Taps Overloading Due to Pickup

1. Improper coolant or coolant not applied correctly.
2. Material too soft.
3. Insufficient hook.
4. Rough grinding.
5. Lands too wide.
6. Chips packing in flutes.
7. Dull tap.
8. Material too soft.
9. Taps too soft—decarburization.

Tapped Holes Vary in Size

1. Check tap holder for proper float.
2. Material too hard.
3. Work hardened hole.
4. "Bugs" forming on teeth of tap.

Rough Threads

1. Improper coolant or not applied correctly.
2. Material too soft.
3. Improper hook.
4. Roughness may be caused when tap is backing out—in this case back off heel.
5. Dull taps, not hard enough or decarburization.

Broken Teeth

1. Tap may be too hard.
2. Improper chip elimination.
3. Material too soft or too hard.
4. Improper hook angle.
5. Improper lead angle or chamfer.

TROUBLES IN CUTTING O.D. THREADS WITH DIE HEADS

Thin or Pulled Threads

1. Material too hard.
2. Die head not lined up.

3. Wrong lead on chasers.
4. Improper coolant or coolant not applied correctly.
5. Improper chamfer on part being threaded.

Rough Threads

1. Not sufficient hook.
2. Material too soft.
3. Too much speed.
4. Dirty coolant.
5. Improper coolant or coolant not applied correctly.
6. Too much face angle on chasers.
7. Proper dimension prior to threading.
8. Chasers not cutting evenly.
9. Chasers too soft—decarburization.

MILLING TROUBLES

Cutter Hogs In

1. Too much speed.
2. Material too soft.
3. Too much rake angle.
4. Loose work table.
5. Improper coolant.
6. Not enough feed.
7. Loose spindles.

Excessive Vibration

1. Too much speed.
2. Too much rake angle or rubbing.
3. Material too soft.
4. Material too hard.
5. Cutter not cutting steady — flywheel should be applied to cutter arbor.
6. Loose spindles on work table.

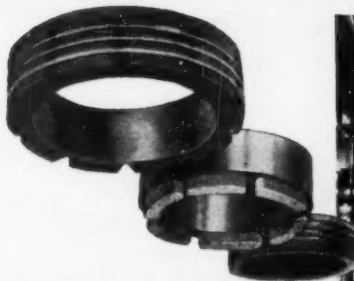
Cutter Wear

1. Too much speed.
2. Not enough feed.
3. Improper coolant or coolant not applied correctly.
4. Loose spindles.
5. Too much land.
6. Not enough rake angle.
7. Abrasive material.
8. Material too soft.
9. Soft cutters—decarburization.

Cutter "Bugs Up" and Burns

1. Improper coolant or coolant not applied correctly.
2. Soft material.
3. Too much speed.
4. Not enough feed.

From the NEW Blanchard Wheel Shop



VITRIFIED WHEELS

For more than 25 years, Blanchard has directed its efforts toward developing the best grinding wheels for Blanchard Surface Grinders. It began by pioneering with silicate bonded wheels, and then resin bonded wheels. Now, from a new, ultra modern Blanchard wheel shop come *vitrified wheels* ... scientifically batched, pressed and fired ... with positive control of time and temperature.

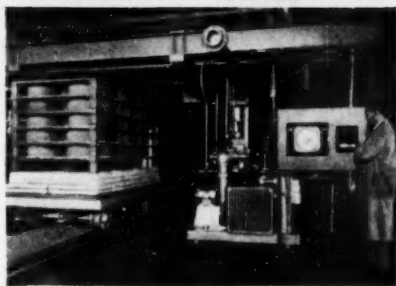
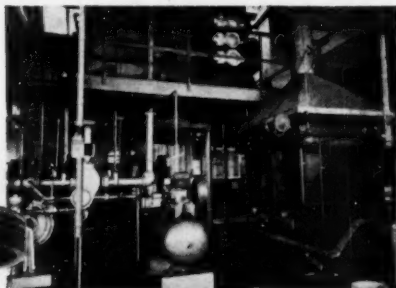
Today, Blanchard offers complete wheel service ... silicate, resin and vitrified!

Use Blanchard wheels on your Blanchard Surface Grinder. They do a better job in less time, with less trouble and cost ... whether your work is tough as copper or fragile as glass ... whether it requires heavy roughing cuts or clean-up cuts with flatness to .000005" and finish of 1 micro-inch.

for Better Blanchard Grinding



THE BLANCHARD MACHINE CO.
64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.



COUPON

Please send free copy of Blanchard Wheel Booklet and Wheel Holder Folder. BB

NAME _____

COMPANY _____

STREET _____

CITY _____ STATE _____

5. Hook and clearance angle not right.
6. Too much land.

Cutter Burnishes Surface

1. Too much speed.
2. Not enough feed.
3. Lands too wide.
4. Loose spindles.
5. Hook and clearance angles not correct.
6. Work table too loose.
7. Material too hard.

BROACHING TROUBLES**Poor Finishes**

1. Soft material.
2. Improper rake angle and not sufficient slide or slip clearance.
3. Improper alignment of broach.
4. Improper coolant or coolant not applied correctly.
5. Poor chip elimination.

Tooth Breakage

1. Soft material.
2. Too much rake angle.
3. Teeth too thin.
4. Broach puller out of alignment—check center of axis of broach with axis of face plate, as these must be in line.

Drifting

1. Check center of hole so it is in line with center of broach.

Excessive Wear on Teeth

1. Abrasive material.
2. Broach drifting.
3. Improper coolant or coolant not applied correctly.
4. Part being broached gets too hot.

Chatter

1. Pulling broach too fast.
2. Teeth too sharp—hone.
3. Parts not held tight enough.
4. Load per tooth too great.
5. Improper coolant or coolant not applied correctly.

Parts Will Not Hold Size

1. Parts not held securely.
2. Parts too weak may spring out of shape.
3. Improper coolant.

Tearing

1. Soft material.

2. Not enough hook.
3. Improper coolant.
4. Not sufficient slide or slip clearance.

REAMING TROUBLES**Rough Finish**

1. Too much speed.
2. Too much feed.
3. Not enough feed.
4. "Bugging" of lands.
5. Lands too wide.
6. Material too soft.
7. Dull reamers.
8. Poor chip disposal.
9. Improper coolant or coolant not applied correctly.

Chatter

1. Too much speed.
2. Loose spindles.
3. Not enough feed.
4. Improper coolant or pressure.
5. Lands too narrow.
6. Not enough stock left for reaming, or too much.
7. Possibly a special reamer should be used.

Burnished Surface

1. Not sufficient stock to remove.
2. Surface prior to reaming was work hardened.
3. Material too hard.
4. Lands too wide.
5. Too much speed.
6. Not enough feed.
7. Improper coolant or coolant not applied correctly.

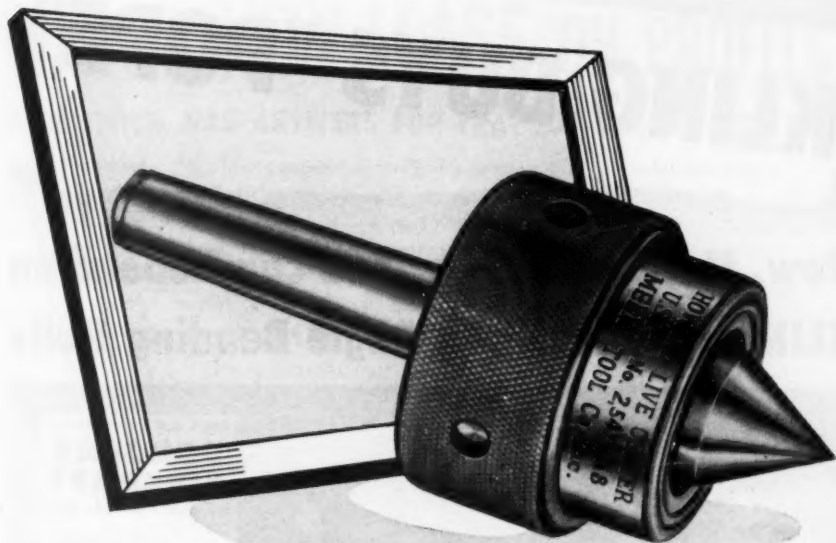
Tool Marks

1. Reamer too roughly ground.
2. Too coarse or too fine a feed.
3. Soft material.
4. "Bugs" on lands.
5. Lands too wide.
6. Speed too slow.

Reamer Binds

1. Too much land.
2. Not enough feed.
3. Too little to ream out.
4. Improper coolant or coolant not applied correctly.
5. Reamer not properly backed off.

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Finest **LIVE CENTER MADE** ... HERE'S WHY

- ★ **BACK UP RING** assures positive rigidity.
- ★ Bar Expansion Eliminated by means of Thrust Spring.
- ★ Special alloy tool steel spindles, hardened and ground.
- ★ Matched precision ball bearings, mounted in tandem.
- ★ Oil impregnated bronze tail bearing.
- ★ Points pre-loaded and ground after assembly.
- ★ A distinctive oil seal in front of bearings protects them from all foreign matter. Chips, dirt and cutting oil cannot reach the bearings.

The HOWARD Live Center is the *ONLY* center that offers the patented *BACK UP RING*. The Ring maintains solid contact between the quill and head of the center . . . thus greatly increases over-all rigidity.

Send for the new MELIN TOOL Catalog No. 54-C . . . it lists, in addition to specifications and prices on the HOWARD Live Center, the complete MELIN TOOL End Mill Line.

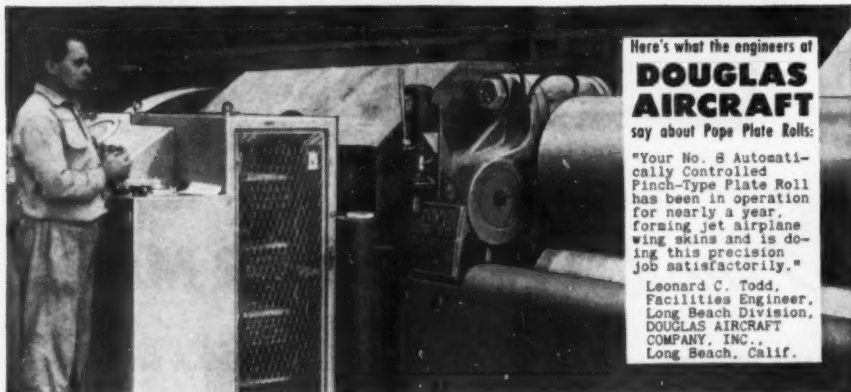


**MELIN TOOL
COMPANY, INC.**
3374 West 140th St.
Cleveland 11, Ohio



KLING BUYS "POPE"

Now, More Than Ever, You Can Depend on KLING for Plate and Angle Bending Rolls



Here's what the engineers at
DOUGLAS AIRCRAFT
say about Pope Plate Rolls:

"Your No. 8 Automatically Controlled Pinch-Type Plate Roll has been in operation for nearly a year, forming jet airplane wing skins and is doing this precision job satisfactorily."

Leonard C. Todd,
Facilities Engineer,
Long Beach Division,
DOUGLAS AIRCRAFT
COMPANY, INC.,
Long Beach, Calif.

You already know Kling as a leading maker of angle bending rolls. Recently Kling purchased Pope Machine Co., Inc. of Seattle, Wash., one of the principal producers of plate rolls. This important acquisition greatly expands the facilities and scope of both companies—and now makes available to you, from one dependable source, the largest selection of bending rolls of all types for all purposes.

Pope Plate Bending Rolls include both the pyramid and the initial-pinch type, in a wide range of models

and sizes. They are used in a great variety of important applications, from "a tin shop to a shipyard". One interesting application is illustrated and described above.

Following are some of the companies using Kling machines:

Champion Bridge Company	C. & Q. Railroad
Douglas Aircraft Company, Inc.	Pt. Wayne Structural Steel
Middleby-Marshall Oven Company	Rome Iron Mills
Pulverizing Machinery Company	Trane Company
Union Iron & Steel Company	Union Pacific Railroad
Westinghouse Electric Corporation	



Bulletins describing the various types of bending rolls, as well as other
Kling machines, will be sent you on request.

KLING BROS. ENGINEERING WORKS • 1320 North Kostner Avenue, Chicago 31, Illinois

Export Distributor: Simmons Machine Tool Corporation, 50 East 42nd Street, New York 17, N. Y.

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Combination Shear
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KEMPSMITH HAS ANSWERS FOR THAT '54 DOLLAR-QUESTION!

To meet the stiffer competition in 1954 you cannot afford to burden your milling machines by paying extra overhead charges to absentee owners. When you own your Kempsmith milling machines, you pay yourself the full dividends on your investment. Outright ownership of a modern Kempsmith milling machine will help you hold your profit-line and remain competitive. By **BUYING** Kempsmith milling machines you can eliminate "double-charges" on your job costs.

You can buy KEMPSMITHS at reasonable cost . . . because they are designed to avoid costly non-essentials. Their practical performance advantages **keep costs low for operation and maintenance.**

Get KEMPSMITH Millers and you get a new lease on profits.

• *You'll find* interesting data in

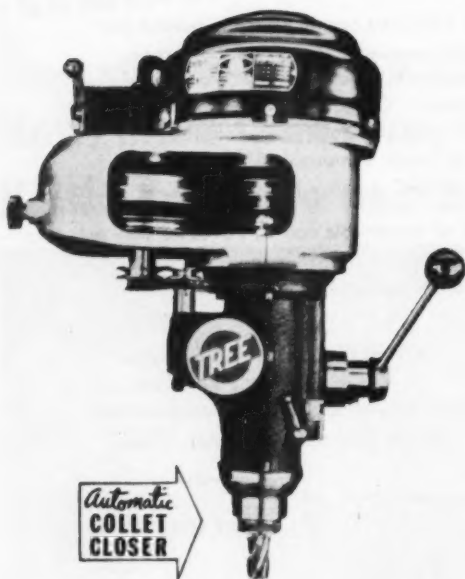
Bulletin No. 134 on the new

IMPROVED TYPE "G" KEMPSMITH MILLING MACHINES

Write for this Bulletin Now!

The advertisement features a large, detailed image of a Kempsmith Improved Type "G" milling machine. To its right, there are three smaller inset images: one showing a different model of a milling machine, another showing a close-up of a machine's components, and a third showing various attachments. The text "KEMPSMITH Improved Type 'G' MILLING MACHINES" is prominently displayed above the main machine. Below the machine, the text "PRECISION SINCE MILLING MACHINES SINCE 1894" is visible. To the right of the machine, the text "KEMPSMITH Improved Type 'G' MILLING MACHINES" is repeated. Further right, the text "KEMPSMITH Attachments THAT STEP UP PRODUCTION" is visible. At the bottom of the advertisement, the text "KEMPSMITH MACHINE COMPANY MILWAUKEE, WISCONSIN U.S.A." is printed. The large "KEMPSMITH" logo is at the bottom center.

do you need . . . VERTICAL MILLING CAPACITY?



You can add vertical milling capacity by adapting the versatile TREE MH-4 Vertical Milling Attachment to your present horizontal milling machine. The MH-4 gives you all angle milling, drilling and boring with a high degree of accuracy because of its built-in rigidity. Spindle — alloy steel, hardened and ground Roller drive eliminates back-lash. Quill — 4 inch travel. Enclosed micrometer depth stop. Power feed. Write today for full information.

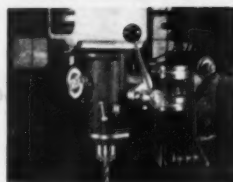
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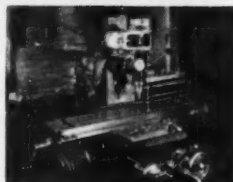
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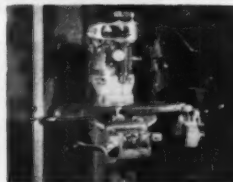
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TREE TOOL AND DIE WORKS
1600 JUNCTION AVENUE
RACINE, WISCONSIN

"Quickie Reports" On ASTE Papers

Beeswax, Paraffin, Wax Paper Stretch Metal

Beeswax, paraffin and wax paper are some of the "broom closet" items industry uses to keep friction at a minimum when stretching steel titanium and other tough metals in one of industry's most progressive processes, Kingsley Drone, chief engineer, Huford Machine Works, Inc., El Segundo, Calif., said.

Drone discussed the principles of the cooperative support of process which has received government agencies, the Air Force and commercial aviation industry since World War II. In stretching steel to shapes outlined by dies, he pointed out that friction must be at a minimum if sleek surface, such as those required for aircraft bodies, is to be achieved.

Gun That Shoots Handles

"The gun which shoots handles" is solving production problems in steel mills and many other industries, according to R. C. Singleton, industrial sales manager, Nelson Stud Welding Division, Gregory Industries, Inc., Lorain, O.

Singleton described how a special stud, similar to an eyebolt, is "shot" onto galvanized hot water tanks enabling ease of handling through wash, pickle, galvanize and cooling operation. It reduces manual handling to a minimum, he added. Product designers have so accepted the stud weld principle that it is planned for in primary de-

sign of new products and product improvements, the Ohio executive said.

Search for Metals that Stay Strong at 1200° F

Metals that stay strong and refuse to melt at temperatures above 1200° are demanded for jet aircraft and guided missile rocket motors, F. H. Stevenson, welding engineer, Aerojet-General Corp., Azusa, California, said.

In designing jet aircraft and guided missiles, the designer must "choose the material which will give the highest strength for the temperature to which it will be subjected," Stevenson said.

Some of these materials, he added, are the stainless steels, nickel steels, titanium and super-alloys.

Plastic Autobodies

"Plastic autobodies mean higher quality and longer life," Wm. A. Hermonet, technical representative, Naugatuck Chemical Division, United States Rubber Co., Detroit, told ASTE members.

"True, plastic autobodies are not in mass production at the present time, but how long do you believe they will be playing in the 'sand-lot league,'" Hermonet challenged. History of the first commercially produced plastic autobody—the Alembic I made in California in 1952—is evidence of the advantages to be gained by using plastic autobodies, he added.

Plastic Tools and Dies Can Cut Costs

Lower prices of automobiles and home

Here are some quick reports of the papers delivered at the 22nd annual meeting of the ASTE Industrial Exposition, Philadelphia. It is suggested that readers interested in further information about any subject contact the Society in Detroit, or the author and his company. Detailed information will be readily available.

appliances can be achieved by wider use of plastic tools, according to G. C. Adams, staff engineer, Rezolin, Inc., Los Angeles, Calif.

"Entirely too many people are prone to think of the automobile industry, the appliance industry or many other industries as requiring tooling for millions of parts. This is not correct. In many cases, the required production consists of only a few thousand parts. . . . Over-tooling of these projects . . . has imposed a severe economic burden on industry. Properly designed and built, plastic draw dies will economically handle this type of production schedule," Adams said.

Plastics Revolutionize Tooling-up

Plastics are revolutionizing industry's costly tooling-up process, but Benjamin Sokol, plastics engineer, Republic Aircraft Corporation, Farmingdale, New York, warned that "careful consideration must be given to each proposed application."

"Not many years ago the suggested use of plastic materials in the construction of jigs and fixtures would have been ridiculed," Sokol said.

Rapid progress in the development of new plastic manufacturing techniques has turned that ridicule to acceptance, he added. For example, a metal tool that weighed 3100 pounds was replaced by a plastic tool weighing only 240 pounds.

Metal Powders Squeezed Into Solid Metal

Citing proven cost savings of 77%, J. F. Kuzmick, president, Welded Carbide Tool Company, Clifton, N. J., said powdered metals offer tremendous savings for modern industry.

The 77% savings Kuzmick cited were in the production of toy locomotives. He said the use of powdered metals molded under extremely high pressures made the toy sturdier and reduced machining scrap to a negligible amount.

Iron powder, he said, is being used to reduce costs, and thus prices, of adding machines, where it is being molded into parts previously machined from bars.

New Metals from Clay

New materials unknown in nature have been created by wedding clay and metal to solve production problems for jet aircraft, according to George Stern, vice-president and technical director of American Electro Metal Corporation, Yonkers, New York.

"Conventional alloys simply won't do," Stern continued, "because they drop off markedly in physical properties at about 1700° F."

Powder metallurgists solved the problem by developing new materials, called "cermets," which take heat in stride, Stern pointed out. These are combinations of ceramics and metals. He added, the future of cermet materials is unlimited because they withstand temperatures ranging from 1700° to 2500° F.

Whispers of Air Divide The Inch into Millionths

Tiny whispers of air are dividing the inch into millionths and making possible industrial progress only dreamed about a decade ago, according to a talk by W. I. Wilt and H. Kiefaber of the Sheffield Corporation, Dayton, Ohio.

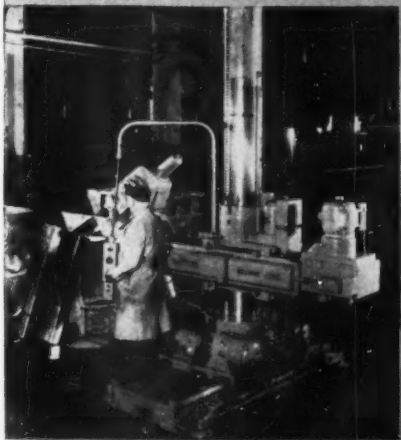
"New ways are being found every day in which air can be used to divide that inch smaller and so make it easier for production and inspection people to turn out and accept good parts in accordance with prints at lower cost of production. The development of the gaging cartridge has further advanced the technique of pneumatic gaging, and tremendously widened its field of use," they said.

Metals Can Be Cold Welded

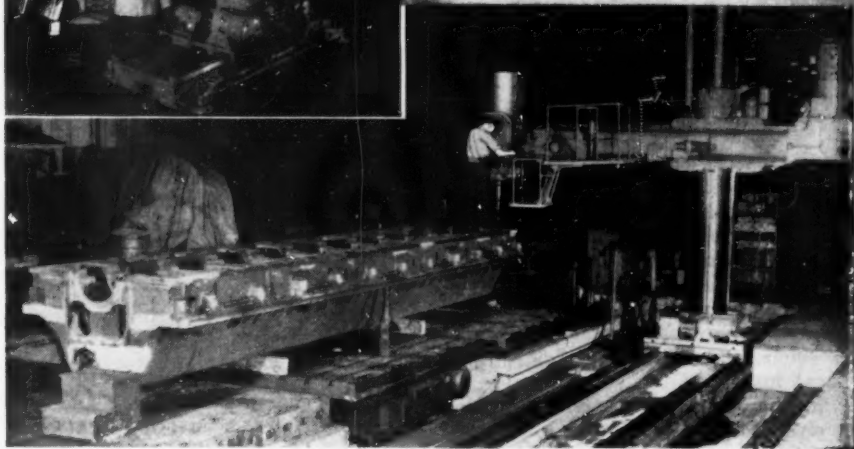
Laboratory experiments on joining of metals by pressure instead of hot weld-

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ing are paying off in production line results now, W. A. Barnes, vice-president, engineering and production, Utica Drop Forge and Tool Corp., Utica, New York, said.

Barnes described some of the tools, similar to pliers but capable of exerting tremendous pressures on small areas, which are used for cold pressure welding. He said, "The process gives excellent welds on copper and aluminum, something never before achieved by conventional methods."

Cold Metal Is Squeezed Like Clay

Squeezing cold steel into intricate shapes, in 3,000-ton hydraulic presses, is opening up new horizons in basic designs for a multitude of products, according to D. I. Brown, market development manager, Mullins Manufacturing Corp., Salem, Ohio.

"The advantages of this relatively new method are apparent in the clean designs that are possible with a minimum of operations. The research and development began with experimental production of 105 mm. shells in 1950," Brown said.

Steel Fractured by Giant Knives

A highly effective way of breaking steel into usable parts is to fracture it instead of shearing through it, according to William C. Tucker, Chief Engineer, Machine Tool Division, Buffalo Forge Company, Buffalo, New York.

Tests prove shear-fracturing round or square steel billets actually helps visual inspection for defects.

"Pressure of shear knives," Tucker emphasized, "will not obscure any defects that may be at the center of steel." He noted that 90° square surfaces on both ends of the shear fracture blank are easily obtained, although shear-fracturing would not readily suggest it as possible.

Ultrasonic Tools

Vibrating at 27,000 blows per second,

a modern tool, used to engrave precious stone in the jewelry industry, opens up new industrial possibilities, according to Joseph Aloisio, of the Research Division, Raytheon Manufacturing Company, Waltham, Massachusetts.

Use of this ultrasonic machine tool has rapidly spread to other jobs in a variety of industries as "brittle and generally hard-to-machine materials are easily shaped by the ultrasonic machine tool. Accurately shaped, highly intricate holes are easily drilled in such materials as glass, ceramics, carbides, and granite," he said.

Freezing of Metals

Natural aging of metals for strength is as important to industry as natural aging of whiskey for flavor is to distilleries.

How modern industry speeds the "growing up" process by chilling the metals to 120 degrees below zero was described by R. S. Jamison, assistant to the president of Sub-Zero Products Co., Cincinnati, Ohio.

"Chilling to 120 degrees below zero increases the hardness and improves the uniformity of the metal both in size and structure. Swiss gauge makers aged their steel in the Swiss mountains for as long as seven years. Today's gauge manufacturers achieve the same results in a fraction of the time and cost through sub-zero chilling," Jamison said.

Electric Eyes Slash Costs

Electric eyes are "better than a human brain" in steering tracers for intricate contour flame-cutting of metal, according to R. F. Helmkamp, machine cutting specialist, Air Reduction Sales Co., New York City.

Helmkamp said electric eyes on an electronic tracer are not susceptible "to the effects of illness, fatigue and varying degrees of reflex response" and can trace a pattern for the electronic metal

cutting machine "with consistently greater accuracies and higher speeds than can a human operator using a manual tracer."

New Machine Grinds Jet Blades

An entirely new machine has been designed and produced for grinding the air foil surfaces of jet engine blades and other extremely convex or concave shapes, A. A. Alt, chief engineer, Planet

Products Corp., Cincinnati, Ohio, said.

"Although accuracy was of prime importance, production rate had a major influence on the design," he said. The back of the machine was left open for easy access to motors, pumps, filter and cylinders. Basic tooling, Alt pointed out, was designed so that the machine could be quickly changed from setup for one blade contour to another.

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Sandpaper Isn't Sandpaper

Latest use for sandpaper is its adoption by plastic surgeons as a tool in the operating room, E. E. Oathout, products engineer, Behr-Manning Corporation, Troy, New York, said.

Spotlighted in his speech was the precision yielded in using sandpaper. Print can be shaved from a newspaper without gouging the surface, Oathout pointed out. Also cited was a machine which removed a pound of steel per minute using sandpaper.

Hot Metal and Cold Wax Patterns for Intricate Shapes

Pouring hot metal around cold wax patterns makes it easier to cast the intricately-shaped parts demanded by modern industry but makes exact predictions of accuracy more difficult, according to R. L. Wood, president, Arwood Precision Casting Co., New York City.

"Human variations in speed and efficiency of performing certain operations" and weather fluctuation result in minor changes, he said. However, if these were the only variations foundries had to contend with, the problem of producing precision castings by this "lost wax" method would be relatively simple, Wood said.

Cast Iron Shot and Apricot Pits Blast Dirt

Over 300 pounds of cast iron or apricot pits hurled against a metal surface per minute by whirling blades is typical of the airless blasting method for cleaning metals, according to F. W. Pedrotty, manager of application engineering, American Wheelabrator and Equipment Corp., Mishawaka, Ind.

He said new records of efficiency were being set by airless blasting machines. With this method, he added, a 15 h.p. motor can throw as much abra-

sive in a minute as the sandblast method could by using a 190 h.p. air compressor.

Thin Films Reduce Rust

Thin films that reduce rust on metal and provide an excellent base for all oil paints were described by C. W. Ostrander, service manager, Allied Research Products, Inc., Baltimore, Md.

Zinc coatings on iron and steel protect them from weather, but they tarnish and retain unsightly finger-marks, he said, and paint will peel from zinc coated surfaces.

"Chromate treatments now eliminate those disadvantages," Ostrander stated. These thin chromate conversion coatings may be colored or clear and may be bleached off to give a surface for nickel or chrome plating, he added.

"Human Element" in Accuracy Eliminated

Reliance on the "human element" to produce high precision on new products



is being largely eliminated, according to C. B. DeVlieg, president, DeVlieg Machine Company, Detroit.

DeVlieg listed his "ten commandments" for any precision boring machine to insure accuracy as close as .0002-inch. He said the modern boring machine is eliminating costly jigs and holding devices, thus speeding production and lowering costs.

Scientific Formulas Replace Whittling

There's more to "whittling" or cutting metal than just making the chips fly. Formulas galore are necessary in practically every phase of metal-working to produce America's pots and pans, cars and locomotives and the thousands upon thousands of metal products. Mathematical analysis of the cutting operation, with attention focused on the mechanics, aids materially in understanding the variables encountered in

machining, Dr. Bernard W. Shaffer of the College of Engineering, New York University, New York City, said.

Experimental results observed both in orthogonal planing and boring operations check fairly closely with the mathematical analysis made in advance.

Rivets Slash Prices

Small rivets that cost only a fraction of a penny result in lower prices of "just about everything from automobiles and home appliances to luggage and wooden boxes," according to V. L. Bradford, vice-president, Milford Rivet & Machine Company, Milford, Connecticut.

Bradford cited the savings and increased production achieved by a maker of fluorescent lighting fixtures. He said expensive two-part assembly was replaced by design enabling the use of a rivet with a resulting saving of close

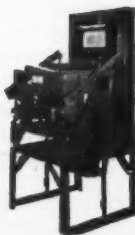
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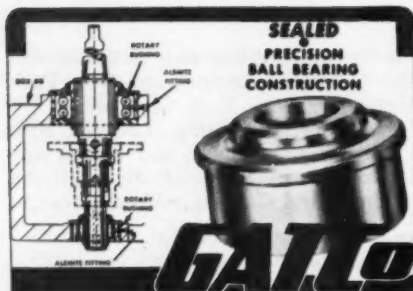
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to \$10,000 per year on this part and a production increase of almost 400%.

Entire Bible Could Be Engraved on One-Fourth of a Postage Stamp

Industry today is using the principle of a machine that could engrave the entire Bible with its 3½ million letters on a ½-inch by ¾-inch piece of metal for a wide variety of metal cutting and engraving operations, according to A. D. Gunderson, assistant chief engineer, George Gorton Machine Co., Racine, Wisconsin.

The machine he described is the pantograph miller, a high-speed versatile machine using a reduction ratio to trace a master pattern normally ten times larger than the finished work. Models range from those about 30 to 50 pounds in size to those weighing over 10,000 pounds, he said.

New Ways of Fastening Things

Find new ways to speed the fastening together of "useless parts into useful assemblies" and you speed production

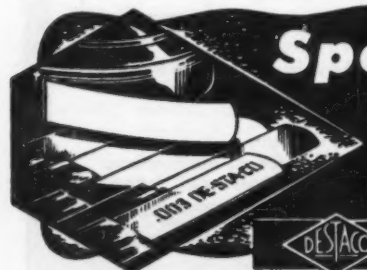
of thousands of common household items as well as industrial equipment, said W. C. Stewart, technical advisor, Industrial Fasteners Institute, Cleveland.

"Be aware of the flexibility of the fastener industry. It will be surprising, indeed, if you don't find a better and more economical way of fastening your equipment . . . There are a great many special devices which will enable you to save money in your plants."

Machines May Think

Science-fiction type machines that can design machines are visualized in the future to take over much of man's creative designing work, H. A. Oldenkamp, director of engineering, and L. Strauss, project manager, American Machine & Foundry Company, New York City, told ASTE members.

Even though "it is possible that much of the design thinking may be done to a considerable extent by future machines," they said there would be a



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place for man. "Future man will be required to feed and interpret information into the design machine," they added.

Completely Automatic Machines

Completely automatic transfer machines performing a wide variety of operations "will help to make more things, both necessities and luxuries, available at lower cost to more people," says D. E. Hawkinson, vice-president, Machine Tool Sales, Greenlee Bros. & Company, Rockford, Ill.

"No other type of machine will allow from 20 to 30 machining passes with a wide variety of tools at cycle rates of from 60 to 125 operations per minute. . . . Without exception, the major units of V-8 automobile engines such as engine blocks are now completely machined on transfer-type machines," Hawkinson stated.

Cheaper Steels, Super-Alloy Hardness

Cheaper steel is replacing high-price alloys in many cases because induction heating can give it a surface strength equal to the alloys, according to C. E. Glick, production engineering manager, and P. N. Sorenson, Chief test engineer, Tocco Division, Ohio Crankshaft Company, Cleveland.

They cited an example where the cheaper steel is now being used for track link pins. Induction heating enabled the manufacturer to reduce costs by eliminating the necessity of using high-priced alloys, they said.

Electric Currents Add Strength

Induction heating uses high-voltage electric currents, without ever touching the metal, to add strength to already strong metals, according to R. S. Segsworth, director of research, General Engineering Company, Ltd., Toronto, Ontario.

"One outstanding characteristic of induction heating is the lack of physical contact between the source of energy

and the work," Segsworth stated. Emphasized by the speaker was the advantage of using "dual frequency" induction heating for reaching high temperatures on steel and for heat treatment.

Machines Drill 300 Holes Per Second

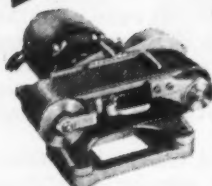
Machines that drill at rates up to 300 holes per second are now a reality and not a designer's dream, Frank Zagar, vice president and general manager, Zagar Tool, Incorporated, Cleveland, Ohio, said.

Production of a million holes per hour in acoustic sound absorbing wall and ceiling tile is possible mostly because of "gearless" drill heads wherein there is no limit to the number of spindles it is possible to use, he explained. Multiple-spindle drill heads can be made with any number of spindles, the limitation being dictated only by the practicality of the job. These machines are now being used for every conceivable



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2



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able type of part ranging from baseball shoes through gas burners, brushes, meat chopper plates or anything that requires holes, Zagar said.

Flashlight Battery Lifts 600 Pounds

Demonstrating how a "common flashlight battery in a four-inch diameter magnet is capable of lifting over 600 pounds," F. Suchanek, field engineer, Sundstrand Magnetic Chuck Division, Rockford, Ill., told of the production line problems being solved with magnets.

Suchanek described how a magnet solved a slotting operation for a manufacturer of tiny precision parts. Machining cost was prohibitive when it was tried to clamp the tiny parts in a vise to allow a 1/2-inch deep slot, only .09-inch wide, to be cut in the part. A magnet, Suchanek said, now holds the part in place for the slotting operation and a production bottleneck was broken.

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Automatic Controls for Indexing Operations Floor-To-Floor Time Reduced 10-20%

POSITIONING, at best, is a waste movement. It must be done as quickly and as accurately as possible. Various systems have been devised by builders to overcome this waste positioning problem, at the same time increasing accuracy. The system we at Wiedemann have devised is a servo-system applied specifically to a turret punch press; however, the system is basic enough that it might find applications on other equipment.

The machine to which this servo-system was applied, figure 1, was a Wiedemann 80 ton turret punch press with a 60" x 120" compound gauging table. Punches and dies on upper and lower turrets respectively are matched and maintained in perfect alignment by retractile locking pins inserted in bushings around the turret periphery. The turrets, which weigh approximately 2½ tons when fully tooled, are chain connected to a common shaft at the power drive. At the time the servo-system was applied, the press had a

By **Walton Rainey**, Electrical Eng
Wiedemann Machine Co.
Philadelphia, Pa.

control system for positioning the turrets.

That control system had these features: a manually operated selector switch to retract the turret locking pins; a manually operated run-jog control device to position the turrets; a manually operated selector switch to return the pins to locking position. The number of manual operations in using the run-jog control was almost indeterminate. That operation depended almost entirely upon the skill and interest of the operator. A certain indexing operation requiring five seconds by one operator

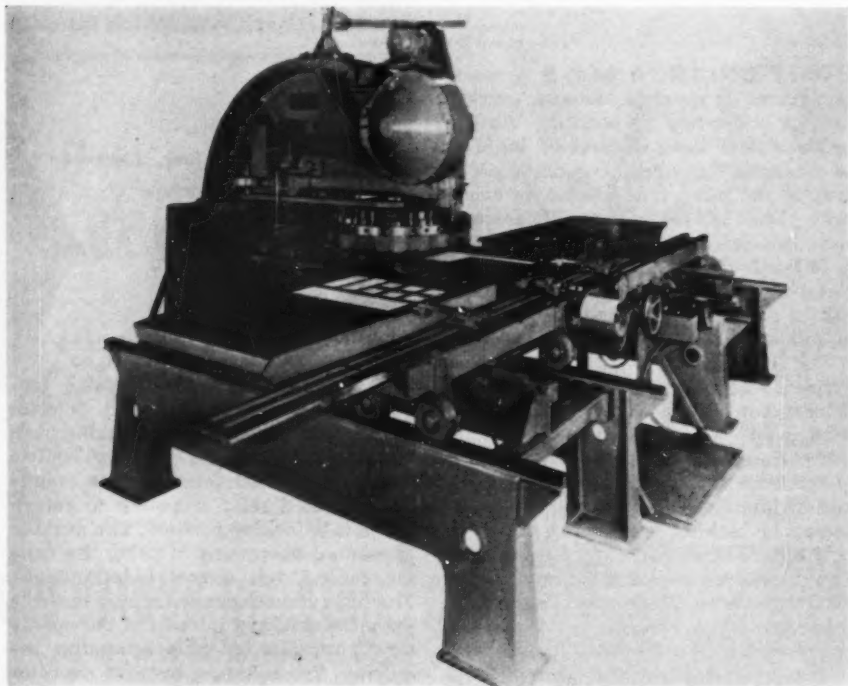
would run as high as 15 seconds with another. The daily average of all indexing operations was approximately 10 seconds. Obviously, to increase machine productivity, it was necessary to convert as many as possible of these manual operations to automatic control.

The new servo-system has an average indexing time of four seconds, virtually independent of the operator. This change was brought about largely by the substitution of a high speed manual operation for the several manual operations formerly required. Actually, the time saved in the indexing operation is more important than may appear at first. Formerly, the operator's entire time and attention were occupied with the indexing operation. Now, while the

servo is functioning, he can concentrate his attention on positioning the work for the next punching operation, or doing other things that would affect the time value of the over-all operation. It is believed that the application of automatic controls for indexing operation on machines of this type will reduce the floor to floor time by 10 to 20 percent over other methods using manual control.

Besides this automation of existing manual operations, it became apparent in the early design stages that the positioning control required (1) a direction-sensitive device which would limit angular travel to a maximum of 180 degrees, (2) a power drive with reversible, variable speed characteristics, and, if

1. An 80-ton turret punch press with a 60"x120" compound gauging table.



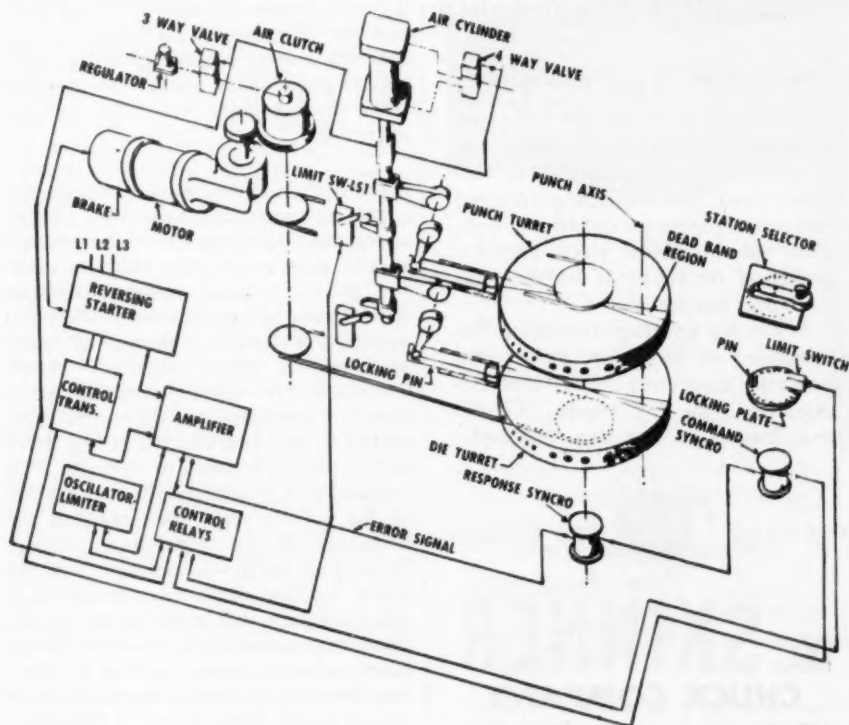
possible, (3) some means for obtaining dead-beat characteristics.

To keep the servo-mechanism as simple as possible, full advantage was taken of the pins used to lock the turrets in place. These pins inherently made available the means for precise angular location as well as for dead-beat positioning. The initial endeavor was to achieve a system whereby the turrets would enter an electrical dead-band region so that the turret locking pins could be released from a retracted position and urged to contact with the turret periphery. In this way, final registry of the turret pins would pro-

vide accurate, dead-beat positioning. Use of the turret locking pins would also provide a means for eliminating the undesirable effects of random disturbances at the turret, and, by a suitable auxiliary locking device similar effects at the command station. By making these eliminations, a variable speed servo-motor would not be required; the power drive could be an induction motor suitable for jogging service, and operated by the familiar contactor or "on-off" type of control.

For positioning turrets, the minimum indexing angle was seven degrees. This meant that the dead-band region could

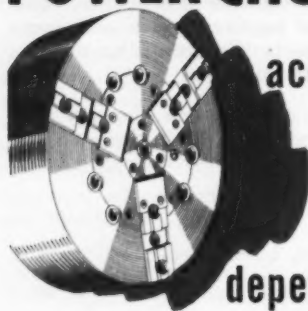
2. Exploded view of the system showing turrets, synchros, power supply, and controls.



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not exceed five to six degrees. Since the mass under control had considerable kinetic energy, it was apparent that some form of braking had to be applied to remove this energy before the set point was reached. Also, switching operations required for application of the brake, in addition to the actual braking time, would result in some physical penetration of the dead-band region before the turrets came to rest. The design requirements of dead-beat positioning imply that the stopping point should occur close to, but ahead of, the set point. Therefore, the boundaries of the dead-band region were not only limited by the minimum indexing angle, but also were directly related to brake efficiency. The dead-band region could then be less than five to six degrees depending upon the energy of the mass and the efficiency of the brake. In any case, the system was set up so that turrets stopped about one to two degrees from the set point, after the braking operation.

First of all, there were some control problems concerning operation outside of the dead-band region. It was realized that if an attempt were made to make the turrets respond continuously and immediately to the dictates of the input quantity, a certain jerkiness of operation would almost certainly result. Therefore, the desired angular error was first generated and the control then locked in that position before the drive motor was permitted to operate. This resulted in a smooth, continuous motion of the turrets until they reached the boundary of the dead-band region. When this point was reached, and the initial braking cycle was completed, it was necessary that some means be devised for penetrating the electrical dead-band region to slowly position the turrets through the remaining distance to the set points. Here is how it was done.

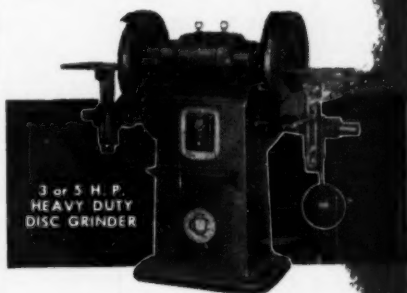
The servo-amplifier was made to oscillate between the outer boundary of the dead-band region and maximum sensitivity, which corresponded to an error of less than 0.1 degrees. A relay oscillator-limiter was used to initiate and maintain this cyclic operation until registry was obtained. The oscillator section merely causes a relay to make and break on a one second cycle, thereby cyclicly charging and discharging a capacitor in the limiter section. During the capacitor charging cycle, the limiter contacts momentarily close. The circuit is so arranged that sensitivity is shifted to maximum when the limiter contacts are closed. Therefore, during the charging cycle, the drive motor gives a short burst of power. Essentially then, the oscillator-limiter section is an automatic jogging control, somewhat analogous to a camera shutter.

An exploded view of the complete system is shown in figure 2. The power drive is a standard gearhead induction motor with an integral magnetic-disc type brake. The drive is geared to an air clutch which has a magnetically piloted, three-way valve for regulating air supply. The clutch output drives the punch and die turrets through a chain and sprocket assembly. An over-all reduction of 300 to 1 gives a turret speed of about 6 rpm.

Facilities for driving the turrets outside the dead-band region and for driving them through those regions have been discussed. What about the actual dead-beat positioning through use of the turret locking pins? The locking pins are operated through a double acting air cylinder, which is controlled by a magnetically piloted four-way valve. The ends of the pins are tapered so that, by pressing the pins against the periphery of the turrets, they can enter the bushings before exact registry is obtained. Two limit switches indicate the position of the pins to the rest of the system. In the locked position, punch trip-circuits are energized and turret

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control circuits are de-energized. The limit switch energizing the turret control is made to act before the pins reach the turret periphery so that the pins can be urged against the turrets on the

return stroke without releasing the limit switch.

The End

This is a condensation of a paper delivered at the 18th Machine Tool Electrification Forum, sponsored by the Westinghouse Electric Corp. in Buffalo, N.Y., in April, 1954.

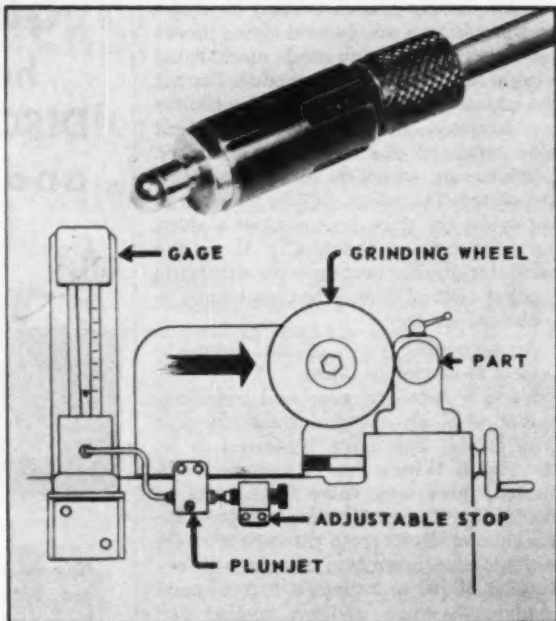
Gage Removal of Metal Without Stopping Machine

A simple, accurate way to gage the removal of metal to the last few tenths without stopping the machine or removing the part has been developed by The Sheffield Corporation, Dayton 1, Ohio.

A Plunjet gaging cartridge connected to a column-type air gage such as a Precisionaire is mounted on the infeed slide so that it indicates against a fixed adjustable stop attached to the stationary part of the machine. As a result, any movement of the infeed slide is transmitted to the Precisionaire where it is amplified and indicated by the position of the float in the gage.

When the Plunjet is connected to a Precisionaire having an amplification of 5,000 to 1, a movement of only one-tenth (.0001) of the infeed slide causes the float to move a half an inch in the glass column and a movement of fifty millionths (.000050) moves the float a quarter of an inch. This highly amplified visual indication of slide movement permits the operator to make precise slide movements with ease and assurance since he knows and does not have to guess at what he is doing.

The Plunjet and the position of the float in the Precisionaire are set up with a part that is within tolerance. Then each successive part is machined



until the float is in line with the preset pointer on the gage.

Gaging infeed slide movement with a Plunjet enables the operator to know when the part is reaching proper size before it is actually down to the finished dimension. It replaces an operator's questionable "sense of feel" with precise visual indication, thereby increasing production of good parts and reducing the number of rejects. Also, it automatically compensates for wear in the machine slide. The Plunjet gaging cartridge machine control unit permits the use of less highly trained machine operators.



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That's why plant after plant reports that CIMCOOL, in contrast with old-fashioned cutting fluids, can be kept at

work longer. Thus, CIMCOOL greatly reduces downtime and labor costs for cleaning and changing.

Prove to yourself what scientific tests and on-the-job experience have already proved. Put CIMCOOL to the test in your own machines. For a demonstration, just write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

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MODERN TOOLS

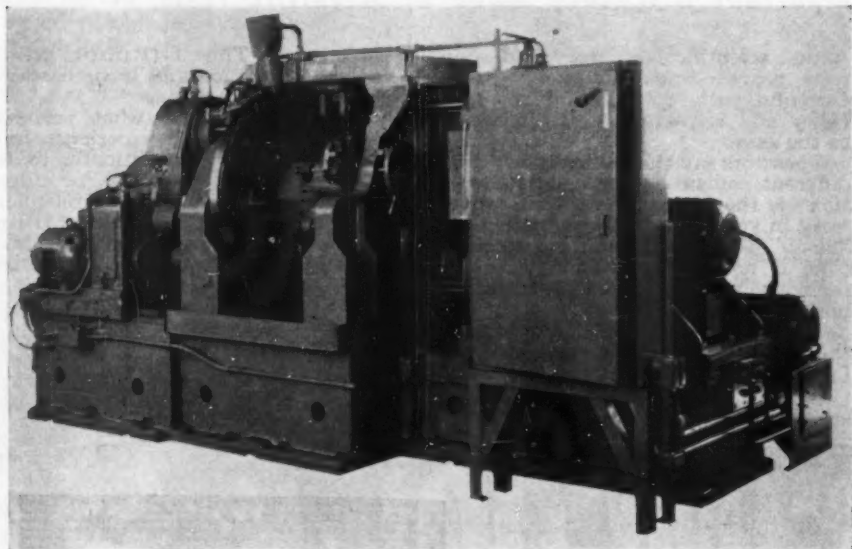
in
ACTION

Special Machines Finish Rear Axle Housings for Tractors

Two special machines were designed and built at the same time for various machining operations on rear axle housings for tractors by Moline Tool Co., Moline, Ill. The Model MR133 bores the housings from each end, and the Model MR132 (shown) drills, reams, spotfaces, counterbores and taps various holes in these same axle housings. Each machine can handle either of two different housings in right hand or left hand design.

In the latter, a power indexing, trunnion type fixture with one loading station and four working stations holds the work. Screw operated end clamps, manually

operated, hold the axle housings. This machine is arranged to have an automatic, electrically controlled operating cycle. A push button station mounted



on the side of the control enclosure serves to control the entire machine. With the work properly clamped in the fixture, the operator presses the button to start the automatic cycle which includes: rotary indexing of the fixture; rapid traverse forward of the tapping head unit, the right-hand drill and ream unit, and the left-hand drill unit. A limit switch starts the tapping motor causing the tapping unit to feed forward through the turning of a lead screw; forward travel of the left-hand and right-hand drill and ream units reduces to feed rate; tapping motor reverses direction of rotation, feeds in reverse direction and stops; drill and ream units dwell against adjustable positive stops, rapid traverse reverse after timed interval has elapsed and stopped, completing the automatic cycle. The operator loads and unloads the work during the operating cycle.

In Model MR133 are two spindles mounted in large anti-friction bearings on each spindle unit. One spindle on each unit is used for the semi-finish operation and the other spindle is for finish boring. Mounted between the boring units is a three-station, hydraulically indexed, electrically controlled, trunnion type fixture with two working stations and one loading station. The operator loads and unloads and clamps the work manually at the front station while boring takes place at the other station. After an axle housing is clamped in place at the loading station, the fixture is power indexed, bringing the part to the second or semi-finish boring station and then to the third or finish boring station. Next, the completed part is returned to the loading station and removed. The fixture is loaded and unloaded at the first station during the operating cycle of the machine.

The hydraulic feed cycle is automatic once it is started by the operator. At the end of the feed stroke, the boring units come up against adjustable positive stops where they remain stationary during a timed dwell, which gives depth control and allows the cutters to clean up the face at the end of the bore before withdrawing at the rapid traverse rate. Production rate is 80 parts per hour, in both machines.

Vertical grinder speeds plow share output

High production rates have been achieved by one farm equipment manufacturer in grinding replaceable plow shares through the use of a Besly No.

953-36" vertical grinder. A maximum of $\frac{1}{4}$ " of stock is removed from each share at a rate of between 350 and 400 steel shares per hour by the grinder.

Adapted for automatic operation, the grinder is equipped with five automatic clamping fixtures which can accommodate 12", 14", 16" and 18" plow shares. The fixtures are mounted on a rotary table which automatically revolves beneath the abrasive disc of the grinder. As a further automatic feature, the grinder is equipped with a mechanism to com-



pensate for abrasive wear. This adjustment can also be made manually.

Duties of the single operator are limited to loading and unloading the clamping fixtures.

Powered by a 100 h.p. motor, this grinder is recommended for finishing parts that require close accuracy coupled with high production. Besly-Wells Corp., 112 South Dearborn St., Beloit, Wis.

Speeds metal fastening

Metalacing, the new one-step method of literally buttoning metal sheets together, has proved to be almost two-thirds faster than riveting in actual production runs by a San Francisco manufacturer.

This is the experience of Otis Sheet Metal, Inc., in the manufacture of its metal bank cabinets. "Just by inserting Metalace punches and dies in our regular punch press," says Erik Skovgaard, president of Otis, "we converted it to metal fastening duty."

"We found Metalacing to be 60 percent faster than riveting in fastening 14 gauge continuous steel hinge to the 11 gauge sheet steel doors of our bank cabinets. On other tasks, where welding formerly was used, Metalacing proved even faster," Mr. Skovgaard states.

Formerly the hinges were riveted to



the doors. This meant three separate operations: punching holes in the hinge plate; punching matching holes in the steel doors; and then inserting and flattening the rivets. Now the whole job is done in one single operation.

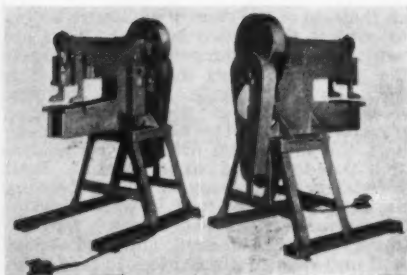
The one-step fastening action of Metalacing stems from three separate operations that occur during the impact of the punch on the metal and the patented die. First, shearing action of the punch creates a double parallel incision in the sheets of metal being fastened. Metal between these incisions is rammed downward against the anvil of the die beneath the sheets and between the die's movable jaws. There the impact spreads the depressed metal sideways to form a permanent fastening wedge or button under the surface of the bottom sheet. Rotex Punch Co., San Leandro, Calif.

Special machine made from standard

A comparatively simple redesign of the supporting structure has, in this case, changed a standard power punch press into a "horn" type of punching machine.

Whitney Metal Tool Co., Dept. B, Rockford, Ill., altered the base arrangement for one of their No. 230 power punch presses to meet the specific needs of a particular customer.

The problem was to provide means for a variety of punching operations in the walls of various steel cylinders and drums. Some of these were several feet in length so an extension foot-control switch was added to permit the operator to trip the machine while handling the work from the outer end. The work, of course, slips over the lower die support or "horn." The customer made up his own fixtures, and his own punch and die adapters.



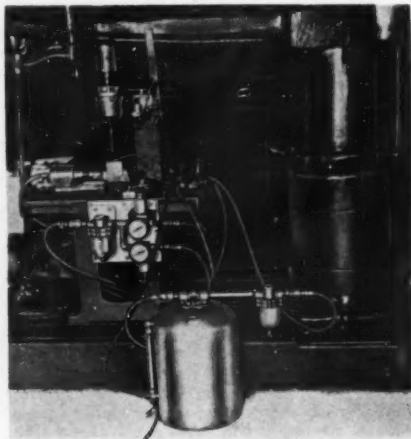
Note the use of a "pancake" type motor for compactness and adaptability, also the reinforced outboard bearing support for the flywheel.

Threads tapped faster with new spray-lube system

At the Standard Tool and Machine Co., St. Louis, Mo., the tapping of 100% threads in the end of a section of thin wall aluminum tubing was a time-consuming, messy operation.

The cutting compound used was a mixture of $\frac{1}{2}$ mineral oil, lard and turpentine and $\frac{1}{2}$ industrial wax. It was applied to the tap by hand with a brush.

Since the new Norgren Spray-Lube system has been installed the operation is much more efficient. Manual lubrication has been eliminated—now it is automatic. Better tapping quality has been produced. The procedure is much cleaner. Machine output has been increased 35%, according to C. A. Norgren Co., 3438 S. Elati St., Englewood, Colo.



Special machine processes two models of housings by simple tool exchange

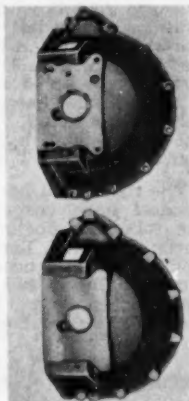
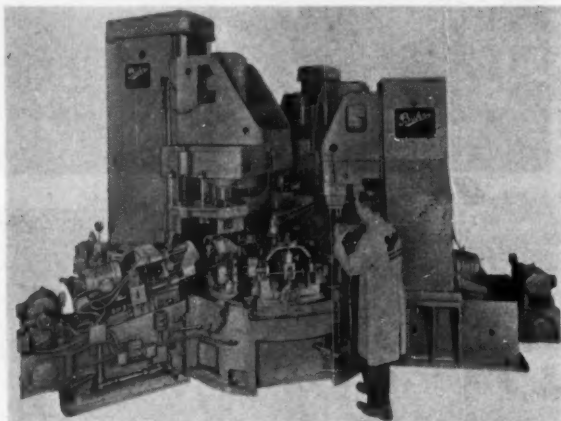
Through the combined efforts of the customer and machine tool builder, a Buhr special is now processing two different models of flywheel housings simply by exchanging tools.

This new Buhr special recently began operation for one of the world's largest

ameter automatic index table.

Forty-two operations are performed on each flywheel housing at the rate of 100 pieces per hour at 100% efficiency—21 drilling, 8 chamfering, 2 reaming, 10 tapping and 1 boring for each housing.

The machine is arranged with tool steel,



automotive manufacturers.

The machine is a 5-way automatic 6-station fixture, arranged with hydraulic clamping and mounted on 60-inch-di-

laminated, hardened and ground ways, and with ball-bearing construction for all spindles. Buhr Machine Tool Co., Ann Arbor, Mich.

Ordnance shells produced better, cheaper by Scaife extrusion process

Development of an improved hot metal working process effecting significant cost reductions in manufacture of mortar and artillery ammunition has been revealed by Scaife Co., Dept. BB, Oakmont, Pa.

This development, a modification of the Ugine-Sejournet extrusion process using glass as lubricant, was first applied to the 4.2-inch mortar shell which Scaife has manufactured since the beginning of World War II as a three-piece assembly of seamless tubing and machined components.

The new method produces this shell in one piece from a simple billet and, according to Ordnance Corps, with "improved quality and significant savings in cost and materials." Important features of the development are in the substitution of readily available billet stock for

seamless steel tubing, a critical material in times of emergency, as well as savings of 25% in steel used.

The new one-piece 4.2-inch mortar shell, with nose adapter integral to the body, starts as a slug of SAE-AISI 1035 carbon steel bar. The slug is heated in a high speed gas furnace to extrusion temperature. Glass either in the form of powder or woven glass fiber is then applied and the slug is positioned in the press. The actual extrusion is completed in less than one second with the glass acting as a viscous lubricant between the die, punch, and workpiece.

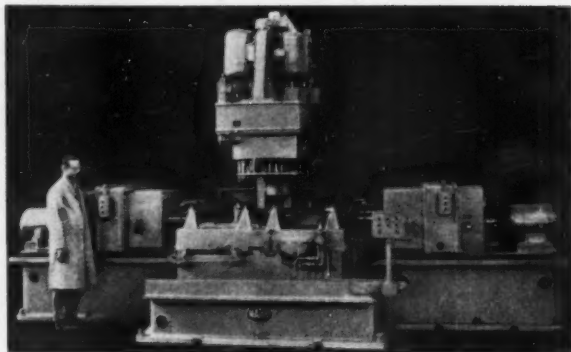
Other advantages cited for the hot extrusion process are: Improved surface conditions minimizing subsequent machining; high extrusion ratio (size of original slug to size of finished piece); reduced extrusion pressures.

Natco unit drills, taps right or left

A new automatic Hole-tapper and driller drills and taps right or left hand tank case parts, according to The National Automatic Tool Co., Richmond, Ind.

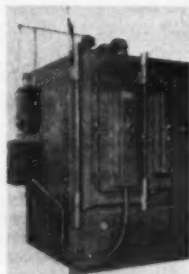
The left hand horizontal head and vertical head perform the following operations on the left hand parts: Position 1. Remove and load; Position 3. Vertical head—tap 4 holes, 1 h. horizontal head—tap 4 holes; Position 2. Vertical head—idle, 1 h. horizontal head—tap 3 holes.

The right hand horizontal head and the vertical head are arranged to perform the following operations on right hand parts: Position 1. Remove and load; Position 3. Vertical head—drill 8 holes, r.h. horizontal head—tap 4 holes; Position 2. Vertical head—tap 8 holes, r.h. horizontal head—tap 3 holes. Each cycle is automatic.



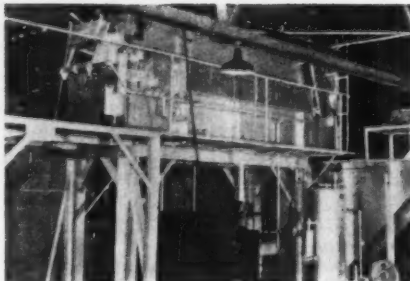
Vacuum furnace for burning emery wheels

This new Huppert electric high temperature vacuum furnace has just been installed in the plant of the J. Yates Dental Mfg. Co., Chicago, Ill. It is to be used for burning emery wheels. This is said to make wheels harder and denser, giving longer grinding life to the wheels. Temperatures up to 2300° F. and vacuum of 29" can be obtained. The burning chamber of the furnace is 27" wide x 37" high x 38" deep. It can be built in a great number of sizes. K. H. Huppert Co., 6845 Cottage Grove Ave., Chicago 37, Ill.



Install hardening furnace on scaffold

The Saint Joseph, Mich., plant of the Auto Specialties Mfg. Co., a large manufacturer of parts used in automobiles and tractors, was faced with the problem



of positioning a Lindberg electric conveyor atmosphere hardening furnace. Since this plant is located on sandy soil just off the shores of Lake Michigan, water would be encountered if a pit were dug for the quench tank. In addition, mobility was desired to allow for subsequent repositioning of the unit if the need arose.

Their practical solution was to place the 17,400 lb. furnace on an inexpensive scaffold that could quickly be dismantled. Large containers holding the work to be treated are hoisted to the loading platform by a lift truck where the operator shovels it into the furnace. After treatment, work drops from the conveyor belt into the quench tank where a flight conveyor drops it into a steel chute leading to tempering baskets. This solution also lends itself to space savings since atmosphere generators, control panels, etc., can be placed under the scaffold.

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Kennametal Grade K5H solid square inserts machine hard steel at increased speeds

The Brunken & Goodwon Tool & Eng. Co., Maywood, Ill., operates three Monarch air tracer lathes on a job shop basis in which they use Kennametal Grade K5H solid square insert tools.

These tools, with the inserts clamped in holders made by the user, are used for both rough and finish machining high hardness steels at up to $\frac{1}{4}$ " depth of cut and .050" feed, and at speeds from 30% to 100% higher.

When chip breakers are required, best results have been obtained with shallow groove type styles (.006" max. depth) and careful honing of the cutting edge.

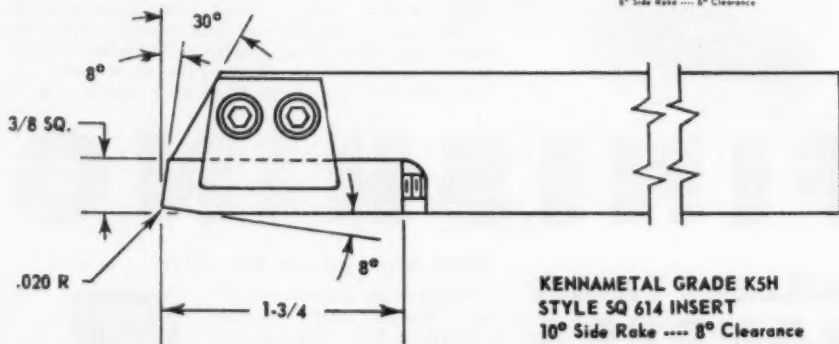
K5H, the hardest grade of Kennametal (93 RWA) is best applied as a solid tool or mechanically held tool. Although primarily developed for precision boring and fine finishing of steel, its high hardness combined with its crater-resistant qualities makes it suitable for machining hard steels at $\frac{1}{4}$ " depth of cut at higher speeds and longer tool life. A contributing factor in obtaining such results is the freedom from brazing strain of the clamped design.

On one operation SAE 3140 axles are turned from bar stock with $\frac{1}{2}$ " solid square Grade K5H inserts. The workpiece, 355 to 375 Brinell, with a file hard skin, is 23 $\frac{3}{8}$ " long with max. dia. of 3 $\frac{3}{8}$ ". The operation is done on a 15 hp Monarch air tracer at .022" feed, $\frac{1}{4}$ " depth of cut per pass, and 270 rpm. Six pieces are turned per grind.

In another application, the job was run on a 7 $\frac{1}{2}$ " Monarch air tracer lathe starting at 1400 sfm at outside dia. of the SAE 3130 gear blank and facing to center hole. The tool is a standard Kennametal $\frac{3}{8}$ " solid square Style SQ614, Grade K5H, clamped in holder. Operating at .010" feed and .050" depth of cut, 70 of these gear blanks are faced between grinds.



KENNAMETAL GRADE K5H
INSERT, $\frac{1}{2}$ " SQUARE \times 2" LONG
8° Side Rake ---- 8° Clearance



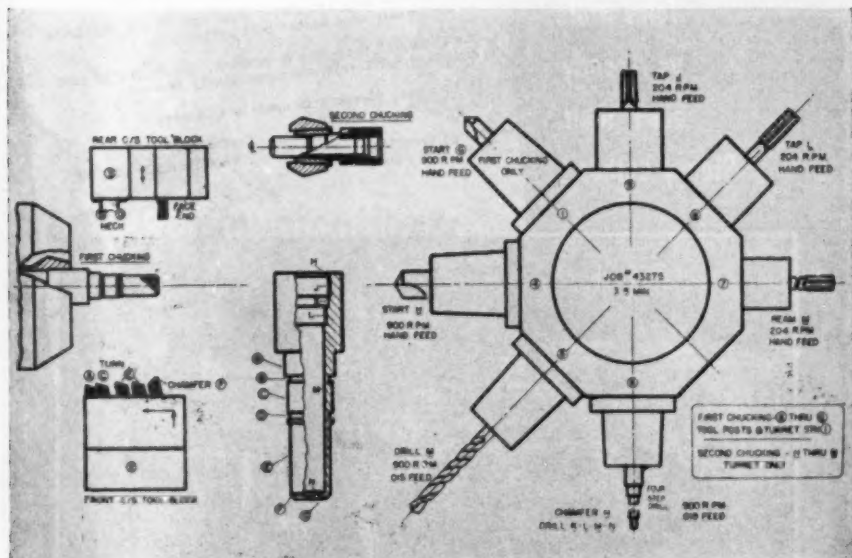
Volume 2 of American Built Machine Tools is now ready for distribution. This volume contains the special reports on Drilling, Grinding, Gear Making and Boring Machines, as well as the report on the MAPI Formula. Write MACHINE and TOOL BLUE BOOK, Wheaton, Illinois, for your copy. Price: \$4.50.

Octagon turret mounts 15 tools to machine complex piece in one setup

An unusual octagon turret (instead of the standard hexagon) and special tooling solved this difficult machining problem on a ram type turret lathe.

The special turret and tool blocks mounted on the cross slide made it

All external surfaces are machined from the front and rear of the cross slide. The part is then unchucked, a bushing slipped over the small o.d., turned end for end, and rechucked with the bushing in the same collet chuck. Internal surfaces are



possible to machine all external and internal surfaces of a difficult piece in two chuckings, with one setup, in a Gisholt No. 3 turret lathe.

The work piece, a 5-5/16 in. bronze air cylinder stem, is held on the large o.d.

then machined from the octagon turret.

Many shops may find considerable advantage to the octagon turret over the standard hexagon. It permits more passes at the work and can be used to simplify tooling and reduce setup time.

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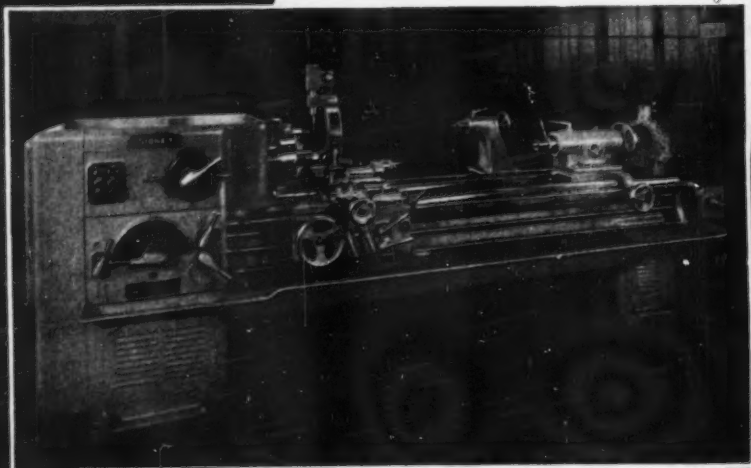
The Sidney is also easy to operate, the height is just right and all levers are conveniently located.

It is a real pleasure to operate a Sidney.

George Maschling
 Tool Room Foreman

Cordially,
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Foremanship Forum

Plant Communications: ... Ideas Must Travel Both Ways

By **Edmund Mottershead**, President
Mottershead Associates
Chicago, Ill.

IN SPITE of the emphasis on the problem of industrial communications, many plant management men are basically as uncertain today about the essentials of communications as they have ever been. This is largely because so much of the current discussion and debate revolves around either particularized details, at the one extreme, or abstract generalizations, at the other.

First we must establish a clear understanding of the realistic, practical principles underlying the whole concept of modern communications. We have to know what we're really talking about when we say "communications," furthermore, what we can reasonably expect, in the way of concrete results, from a well planned, plant-wide "system."

The answers to these two questions are deceptively simple:

1. By "plant communications" or

"communications system" we refer simply to all the means available to a plant for the exchange of ideas and thinking between all levels of management, supervisory personnel, and employees. These include memo pads, telephones, conferences and meetings, suggestion systems, house organs, bulletin boards, plant tours, etc.

2. A communications system is generally expected to increase over-all plant efficiency, productivity, and well-being by:

- (a) making possible the rapid exchange of information between plant elements that, at any given time, can function better as a result of such exchange,
- (b) promoting and maintaining company loyalty and harmony of on-the-job purpose in all members of the plant "team."

Exchange of information, and good

human relations—that sounds simple enough. We've heard this song before? Undoubtedly. But have we really considered the problem's relationship to us today, in the light of the swift and sweeping changes which have become commonplace in our economic system? Is ours a relatively small plant and are we thus assuming that our communications are "as good as ever because all the developments that keep the major plants hopping don't affect

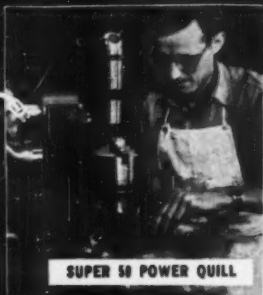
the little fellows like us?" Our present communications system may very well be adequate, but have we **really checked** to see that it is? Have we seriously considered the possibility that it may not be doing as good a job for us as it could?

The key question is: "Is our communications program coordinated and streamlined so as to lead to the greatest benefits with the least wasted effort and expense?" Too many plant programs

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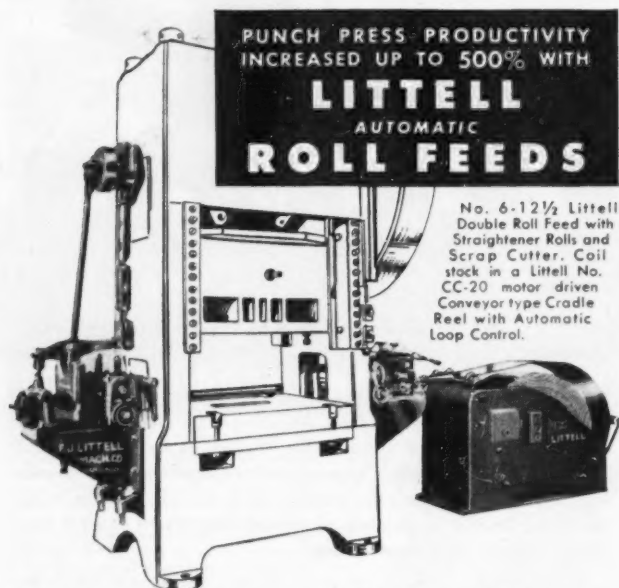
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are clumsy and inefficient precisely because "they just grewed" and were never looked upon as integrated systems designed to result in certain definite objectives.

To help us clarify the problem and suggest solutions—on a hard-headed, down-to-earth level—we contacted a man with years of experience with all aspects of industrial communications. He is Edward O. Dieterle, management consultant for Thor Corporation. We

didn't ask him specific questions, but rather had him give us his impressions of the state of industrial communications today—and what might be done about it.

"There have always been 'grapevines' of sorts in all sizes and types of plants," he began, "and there no doubt always will be—in one form or another. The matter for our concern, therefore, is not whether there will be dissemination of information and thinking in



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the plant at all; even left alone, this will take care of itself. But the question is **how—who will receive what information and when?**

"All so-called grapevines are really 'communications-in-the-rough,' and they manage, in their own way, to get a lot of information passed around. The trouble is, of course, that much of this is misinformation—the result of rumor or misunderstanding. Then too, much

time is wasted, there is too much duplication, and you don't have an effective check on results."

Warming up to one of his favorite subjects, Mr. Dieterle quickly added, "What is lacking in this rudimentary form of communication is **planning**. We know now that it is not enough for information somehow to trickle down to various elements in the plant. We know that provisions have to be made for

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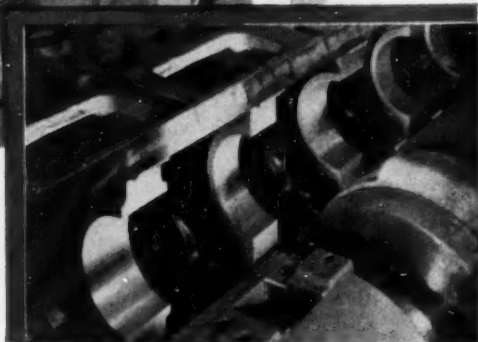
Tools from LEHMANN BORING TOOL used in the multiple facing operation of this milling machine



Photos
courtesy of
Moline Tool
Company

The hydraulic feed milling machine shown above was made by the Moline Tool Company of Moline, Illinois, for the milling of the sides of the main bearings of cylinder blocks for a large engine manufacturer.

LEHMANN BORING TOOL furnished the precision bars, heads and tungsten carbide cutters circled above which machined the multiple straddle facing operation. The close-up view at the right shows the bottom of the cylinder block and the sides of the main bearings after milling.



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everybody in the plant 'getting into the act.' We know that modern communications must be a give-and-take proposition—must involve discussion rather than lecturing or preaching.

"This last is a very important point. I don't like to make the thing sound involved, because it is really very simple. Let me put it this way—telling the other fellow something, even telling him in great detail and in understand-

able language, by no means guarantees that the message will really hit home.

"I may understand what you're saying when you're telling me to do something. I may even understand every word of your explanation of why I should do it. And I may still very well either rebel and simply not do as I am told, or grudgingly perform the task in a careless, unenthusiastic fashion.

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**Model 406
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Cutters and
Nibblers

the making of the decision to assign me the specific job. I feel that I'm being pushed around because I've been given no opportunity to express my opinion—directly or indirectly. It doesn't matter that I probably would have arrived at the same decision myself. It doesn't matter even that I might well have had nothing to say if I had had the opportunity. The point is that I haven't had the opportunity, and I resent it.

"The American worker has always had a strong dislike for 'being told' to do anything. Very often in our early history, it is true, the worker didn't have much of a choice in the matter, he obeyed orders 'or else.' Needless to say, we've come a long way from the early days' frequent browbeating of personnel. It never worked well before; it won't work at all today. The employee today has many more alterna-



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tives to choose from than those summed up by the threat of 'or else.'

"We are, in this sense, a good deal more independent now than ever before. We all are. This means that reason, tact, and fairness are absolutely necessary tools in the carrying on of group conduct of any kind. There must be as much willingness to listen to others in the plant as there is eagerness to ex-

press our own opinions. The plant whose personnel thinks and feels and functions as a well-integrated, cooperative team has a tremendous advantage over the organization whose communications system is still of the grapevine variety."

Mr. Dieterle paused at this point and then moved on to a discussion of the organization of a communications pro-

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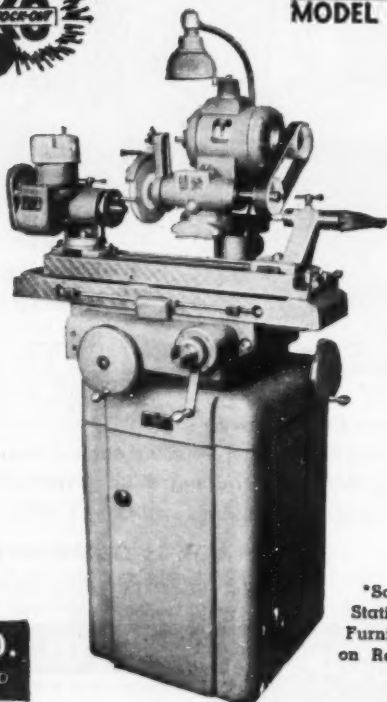
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gram. After exhausting the subject (or to put it more accurately, after exhausting ourselves trying to completely cover the subject), we emerged with some definite ideas and one important basic principle:

A communications program must be planned

You can't afford to maintain a haphazard, hit-or-miss communications

system. No modern plant can. You have to determine exactly what your specific objectives are, and you have to devise a system that most economically and efficiently will achieve those objectives.

Your plant is full of telephones? That's fine—maybe. It depends on where they are, who has easy access to them, and whether they're used in a businesslike fashion.

There's always some conference or other going on inside your plant's walls?

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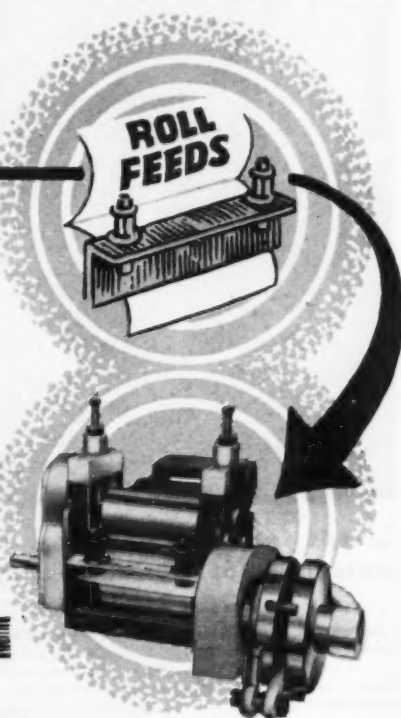
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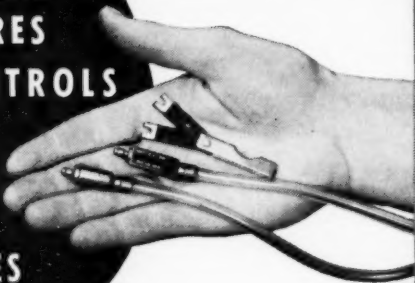
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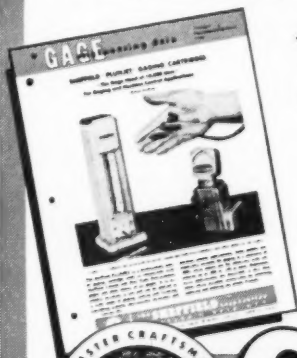
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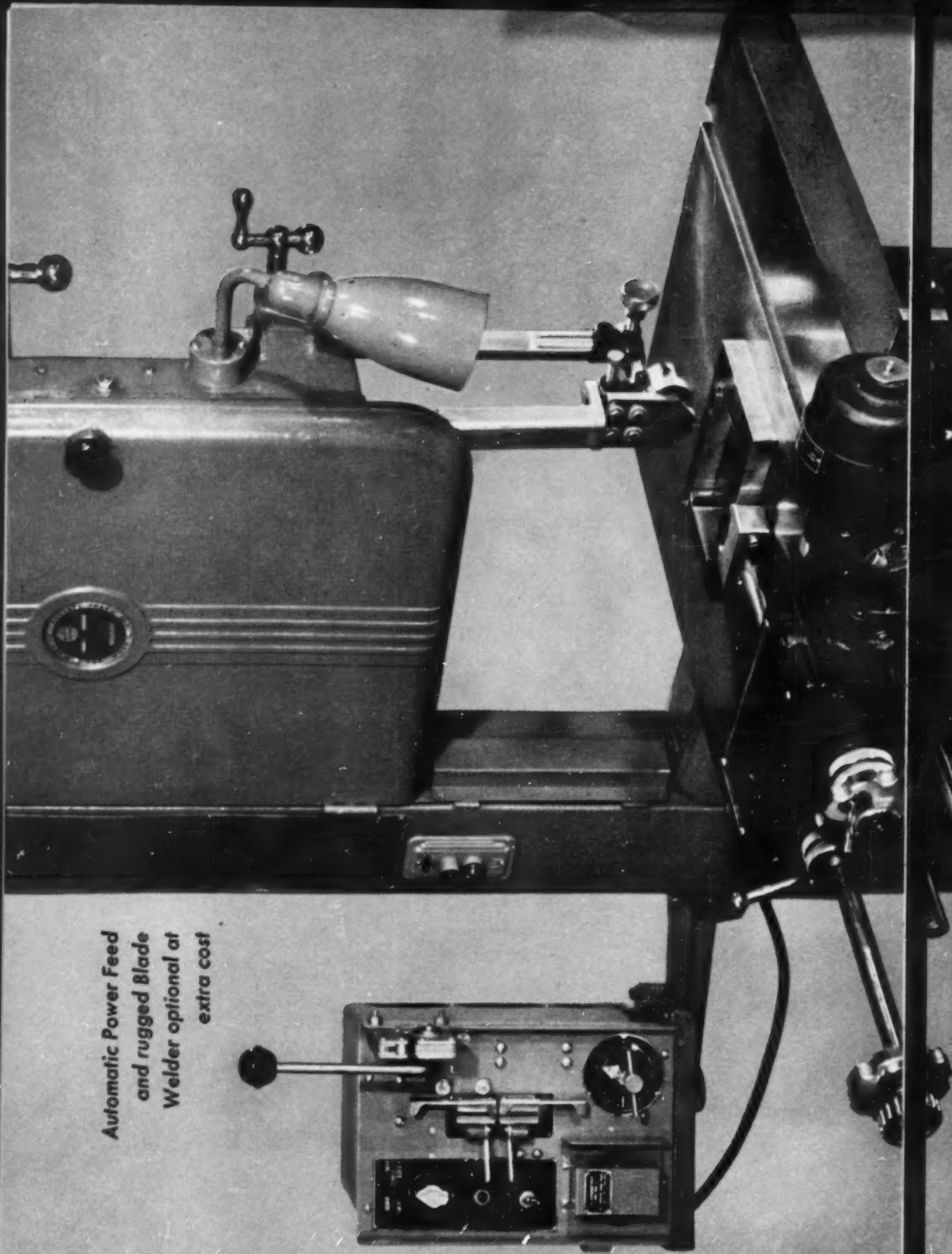
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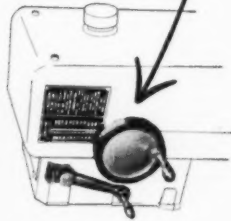
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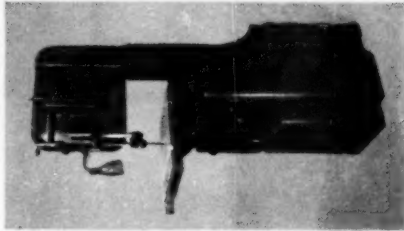
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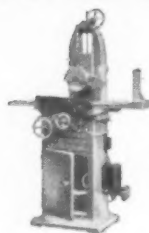
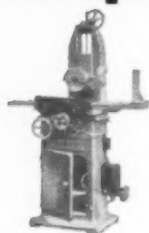
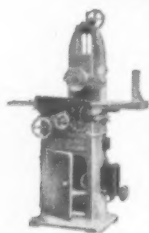
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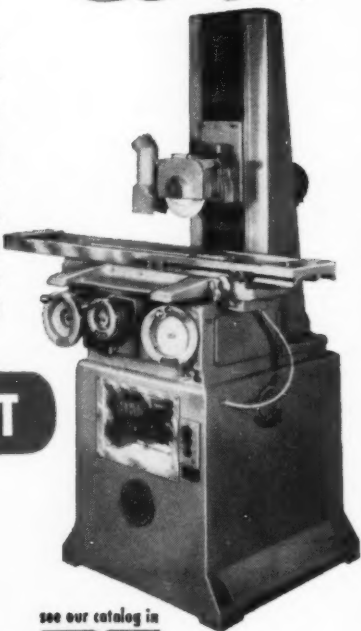
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Sounds fine, but who attends these various get-togethers? Are all members of the plant 'team' given this kind of opportunity to exchange ideas and thinking? If not, are there other channels open to the excluded men—informal worker gatherings, foremen-worker meetings, supervisory meetings? Do your normal plant operations allow for a certain minimal amount of time spent wisely in face-to-face conversation on

ideas and methods having to do with the plant's functioning?

Are there effective channels of communication, in one form or another, between management and workers, management and supervisory personnel, supervisory personnel and workers, one top management group and another top management group? Is the "boss" (on various levels) some sort of shadowy figure to those under him—a kind of

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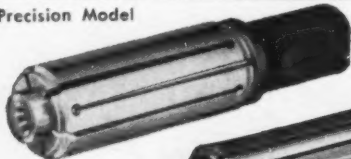
aloof celebrity who is never directly heard from and seldom seen? Or does he command the friendly respect and cooperation of all?

Is there unnecessary duplication of communications channels? Are certain channels being utilized where something else could do the job more quickly and easily? If you find yourself buying tons of memo pads every year, have you checked to be sure that a few well placed telephones wouldn't cut the

amount drastically and improve the system too?

Have you thought of the possibility that you might be able to substitute a few well-planned and organized meetings for the countless chaotic get-togethers now being held regularly? On the other hand, if you have very few or no regular conferences now, have you investigated the possibility of improving efficiency by launching a program of conferences and meetings care-

Precision Model



Standard Model



**makes
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CHAMPION E-X-P-A-N-D-I-N-G MANDRELS

The expanding sleeve, mounted on tapered arbor, expands automatically to fit the hole. Inserted by hand — no arbor press needed. Always an exact, positive, concentric fit. Locked by a single mallet blow. Unlocked the same way. CHAMPION Expanding Mandrels are used in machine shops around the world. Save time, cut production costs, whether the job calls for machining one piece or a thousand.

Precision Model has expansion range of .010". Available in regular sizes to fit holes from 1/2" to 3" diam. Holds work to tolerances of .0002" run-out. Guaranteed for precision grinding, turning and milling operations.

Standard Model maintains close tolerances, handles material of any length bore, hard or soft metals — from thin tubes and bushings to heavy castings and forgings. A set of fourteen will fit every hole from 1/2" to 9 1/2" diam.

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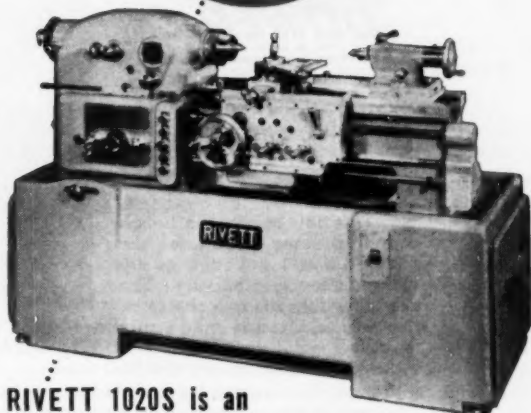
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HAS WHAT IT TAKES TO MAKE
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- ★ 40% heavier than comparable lathes. Weighs 3900 lbs.
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- ★ 12¾" wide hardened steel ways of bed absorb heavy cutting force.
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RIVETT 1020S is an Instrument Lathe and an Engine Lathe

A double-duty machine—combining the feather-touch sensitivity of an instrument lathe with that heavy-biting ruggedness which carbide cutting tools require—qualifies for any turning within its 12½" swing and 20" centers.



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LATHE & GRINDER, Inc.

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You can use other lathes . . . or employ other types of metalworking machines . . . but on no other tool can you get so much production with such fine precision as on a Rivett.

fully designed to achieve certain desirable objectives?

Does a prejudiced fear of "expenses" make you hesitate about thoroughly checking your present communications program? Or are you willing and eager to look for the facts about the cost-savings aspects of a revamped system before you impulsively leap to unwarranted conclusions?

And in our consideration of all these

vital means of communication, do we always keep in mind the importance of communication being **two-way**? Communication among human beings is not a matter of shrewd logic. Rather, the primary attribute is **reasonableness**. You can be the keenest debater in the world and still fall down on the job of building and maintaining good communication with others in the plant. Psychology and emotion are much more

Introducing the **SWANSON**



**A precision bench press
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This new concept in bench punch presses eliminates the use of die sets and reduces die makers' time substantially. The press itself serves as a precision die set, and ready-made punch and die retainers eliminate making special die components. The POWER-DI unit can also be used for existing conventional dies.

Model shown can be mounted to any bench by making suitable opening for self-contained motor and drive assembly attached to lower bolster of press. Exposed working section of press takes little more room than ordinary die set. Ideal for group bench mounting. Models also available for pedestal floor mounting, and for attaching to Swanson Turret Indexing Units.

1 ton capacity — 1 1/4" stroke — 3" to 6" shut height adjustment — 200 strokes per minute. Write for bulletin PDB.

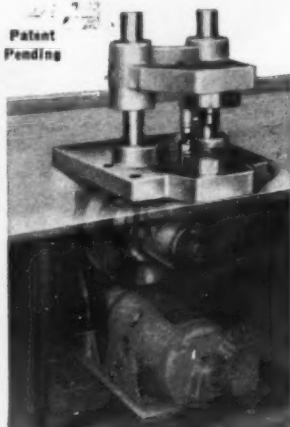
Some other Swanson Precision Products are:

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important factors than sheer mentality and naked logic. As Mr. Dieterle put it: "It is not enough to have a crackerjack idea about how to do a job more efficiently; the ability to get others to really understand you and agree with you is at least just as important."

Conversely, it isn't enough just to live up to Ben Franklin's ideal of the good listener, if in the process we fail to make the necessary effort to contribute something ourselves. We should by all means listen to what the other fellow has to say. (This is perhaps the hardest thing for us to do, because we simply haven't cultivated the habit.) We should try to understand the viewpoints of others even if they initially seem silly to us. (And this is by no means easy.) But we can't just stop there. Our job is but half done at this point. We have to make a contribution to the joint thinking ourselves, and we have to be willing to "take the stump" for our point of view—in the same idea of fairness and objectivity with which we listen to others.

Mr. Dieterle summed up our first discussion with these remarks:

"Of the two objectives of a well-organized communications program—exchange of information and building of good human relations—the second, to my way of thinking, is ultimately more important. While it is certainly vital that pertinent thinking and ideas get swiftly disseminated in the modern plant, it is also true that nothing assures the continuance of such dissemination in the long run more than the immediate building of good morale in the plant now.

"I mean good morale in the same sense of willingness and eagerness to contribute positively to the well-being of the plant. The ideal modern industrial organization is the one which elicits the true understanding and best efforts of all its members. All manage-

ment men and employees should want to do their best, should feel that their efforts are **valuable and properly organized**, should rest assured in the knowledge that they have a 'say' about those aspects of the plant's functioning which directly or indirectly affect them."

This ideal cannot be achieved without a strong assist from a truly modern and efficient communications system. Such a system is basic to the ultimate success of any industrial organization. To deny the importance of industrial communications is to fly in the face of progress. To simply assume, without checking into the matter, that the existing system is "all right as is," that "we've been doing pretty well for the past ten years and we're satisfied" is to risk missing out on many opportunities for improvements.

In subsequent articles, we shall delve into the problem of better developing the **auxiliary** tools of communications in the plant, and try to show why these are so important.

In thinking about plant communications in the meantime, let us keep in mind that the only way to move toward real improvement is to:

- (1) Determine our specific objectives
- (2) Analyze our particular situation
- (3) Find the flaws in our present system
- (4) **Plan** a program.

The End.

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Between Centers**

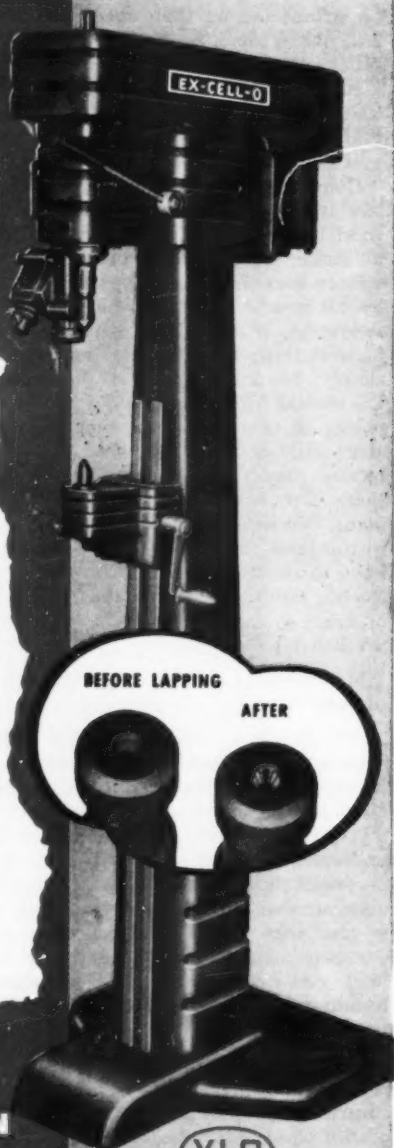
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Shop HINTS



Convenient Boring Tools in Right Sizes Ready When Needed

By Harold D. Rhodenbaugh

ALTHOUGH THERE ARE MANY EXCELLENT boring tools on the market, all adequate for many and varied applications, there is always a need for the boring tool one doesn't have in stock at that particular time when it is needed most.

Because of the vast numbers of combinations of diameters and depths to be bored it is most difficult to stock to potential requirements. Therefore, it is expedient to bridge these boring tool gaps and save time by building and stocking boring tool blanks in size ranges pertinent to your own potential requirements.

Figure 1 charts a boring tool blank and a method of controlling it. Detail

(1) of Figure 1 can be produced on a hand or automatic screw machine at minimum cost if produced in quantity lots great enough to cover cost of setup. This operation consists of turning and cutting off. Concentricity between the two diameters should be held to a close tolerance.

The second operation on these shanks is milling the tip radius. The cost of this operation can be greatly reduced

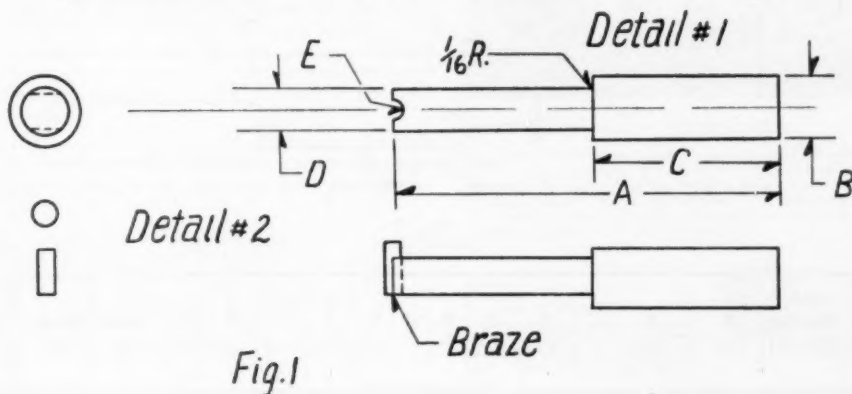
Notes:

Make from 4130

Harden to 35-40 "C" scale

Break sharp edges

Copper braze detail #2 to det. #1 in "E" Rad.



Blank No.		A	B	C	D	E	Detail No. 2	Tip-Grade	Max. Min.
	1¾	.3745 .3750	1"	.250	5/64R	5/32 Dia. x	883		
	2"	.3745 .3750	1"	.250	5/64R	5/32 Dia. x	883		
	2¼	.3745 .3750	1"	.300	5/64	5/32 Dia. x	883		
	2½	.3745 .3750	1"	.312	5/64	5/32 Dia. x	883		
	2¾	.3745 .3750	1"	.312	1/8	1/4 x	883		
	3"	.3745 .3750		.375	1/8	1/4 x	883		
	3¼	.3745 .3750		.375	1/8	1/4 x	883		
	3½	.3745 .3750		.375	1/8	1/4 x	883		

by gang-milling a quantity of shanks at one pass.

Carbide tips in any grade can be purchased at a few cents each.

From a stock of these blanks a boring

tool can be quickly made up and controlled for future use by using the chart in Figure 2.

Figure 2 is cross-indexed to Figure 1 and tools can therefore be reproduced

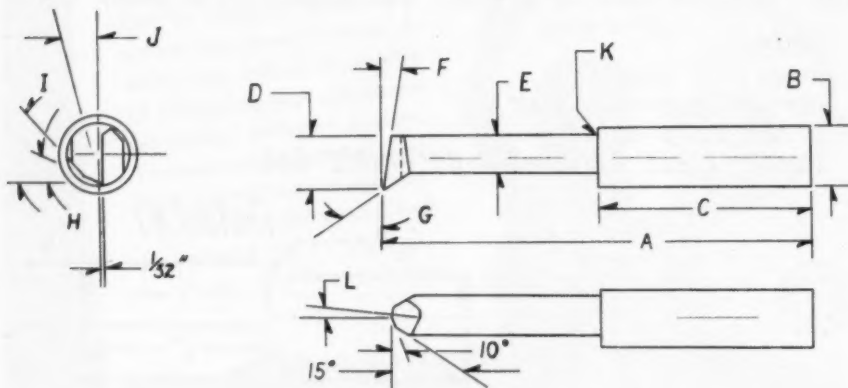
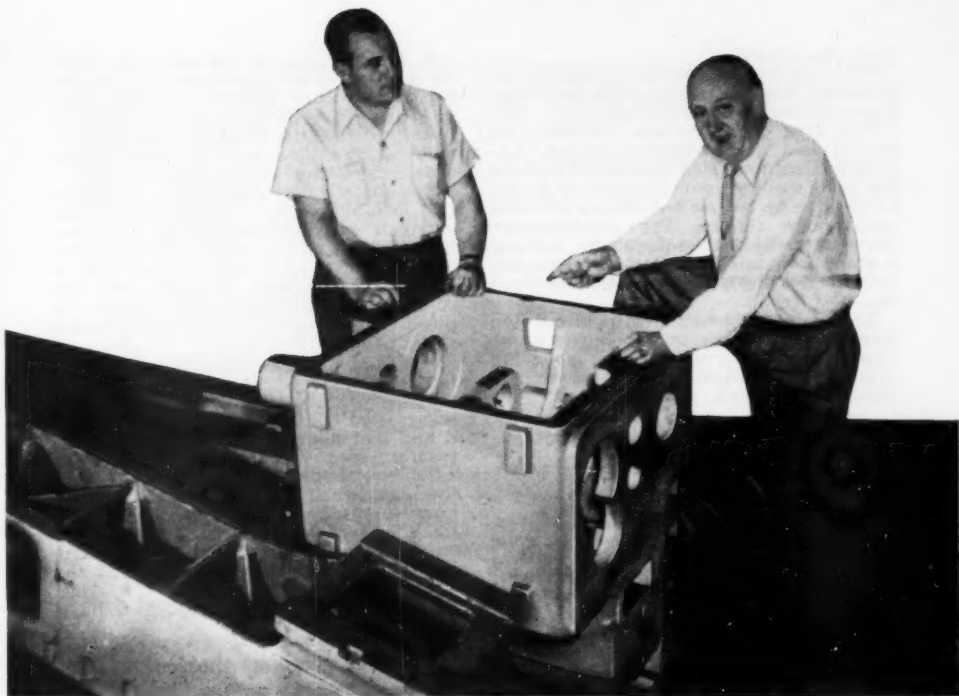


Fig. 2

Std. Number	A	B	C	D	E	F	G	H	I	J	K	L	Blank	Grade
BM 3221	1 3/4"	.3745 .3750	1"	.500	1/4"	0°		10°	15°		1/16R	0°	5/32" x 1/2"	883

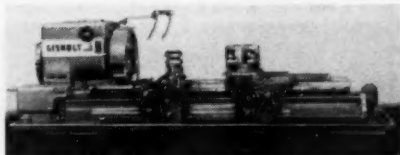


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the HEAVIEST CASTINGS!"**

Look at them . . . castings for the heaviest saddle type turret lathes in the business! Look at all the angles:

First, note how the headstock is cast integrally with the bed for perfect spindle alignment . . . how cross supports give the most solid base for carriages, tools and slides . . . how extra-heavy webbing gives the headstock the ruggedness to support powerful gear train members.

Remember, too, that cast iron absorbs vibration. The heavier the better! And Gisholt controls the quality of the finest nickel semi-steel in its own foundry.



The Gisholt SL Saddle Type Turret Lathe has a net weight of 22,500 lb. without equipment.

What does it mean to you? You can load up your Gisholts with carbides and really turn out the chips! You've got the strength, the rigidity and the freedom from vibration to take all the speed you can get from today's carbides—with the heaviest feeds—and still have the safety margin to take care of tomorrow's tool bit developments.

GISHOLT
MACHINE COMPANY

Madison 10, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

from the sketch.

With charts and blanks available, an adequate tool can be quickly produced with minimum time and effort.

This type of tool is also desirable for boring tool development purposes. Example: Recommended grades of carbide for particular types of material or grades of steel to be cut do not always produce satisfactory results. The recommendations of carbide manufacturers indicate a grade from which to start development, rather than the grade that will produce the best result.

Therefore, it is not unwise to develop from your own blanks. When you know exactly what you want, place your big order with a reliable boring tool manufacturer and stock your stores.

20-year-old keyway cutter comes to rescue

By L. D. McWilliams

While dismantling a 35,000 horsepower hydroelectric unit to rewind the generator, it was noticed that the vertical key in the thrust collar had become loose and had started to roll in the keyway, resulting in considerable damage. This 2" key holds the thrust collar in place and in turn supports the "Kingsbury" bearing on which hangs the combined weight of the rotor and runner, some 200 tons.

At first, consideration was given to splitting the coupling between the rotor and runner, then removing the shaft from the rotor and shipping it to the makers to have a new keyway cut.

Had this procedure been followed the

cost of removing the 150 ton rotor from its 30" shaft could have easily run into several thousand dollars. To this must be added the down time and loss of revenue while the shaft was away. Estimate at the time was six weeks, plus time for removal and reassembly.

Fortunately for some of us, there are still in circulation a few old "Joes" who got their early training fixing old mowing machines and harvesters with a minimum of parts and tools. It was such a character who came forward with the suggestion of cutting a new keyway in place, a suggestion which undoubtedly saved \$20,000.

The accompanying photograph shows the apparatus that was rigged up for the purpose: An old 10" keyway cutter was resurrected from the basement where it had lain idle and almost forgotten for twenty years, except to old Joe.

Some revamping was necessary to adapt the monstrosity to the 30" shaft. A hurry-up call was put through to Montreal for large diameter milling machine cutters. The most difficult part of the job was the lining up. After that the job proceeded smoothly.

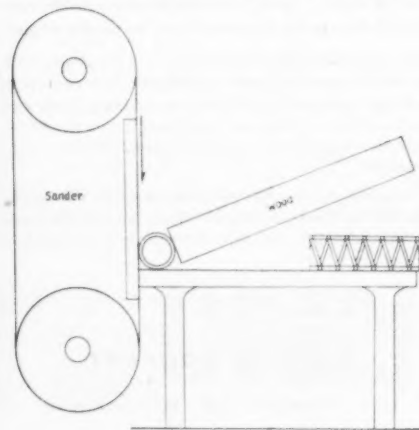
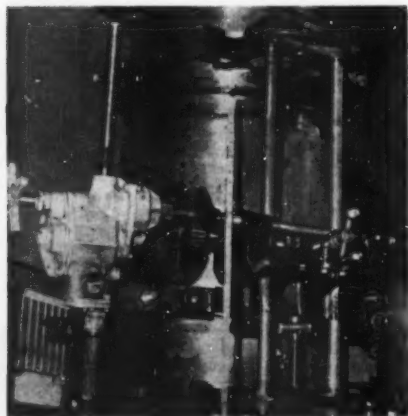
Time taken to cut keyway: Five days.

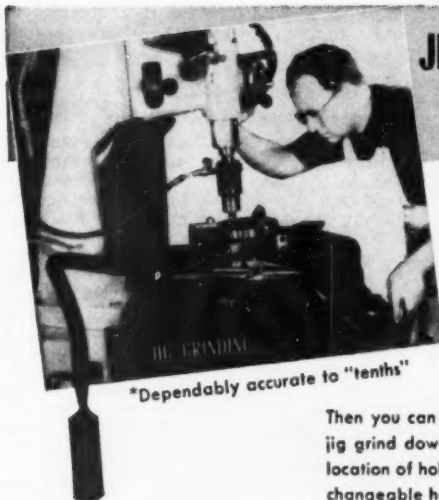
Cost: \$400.00.

Cylindrical grinding shortcut

By Wm. C. Betz

In the course of making a die, a tool-maker found that shedder springs furnished would not enter the well holes due to their being oversize, and as the die parts were hardened and finished the problem of reducing the diameter of





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this jig grinder to jig borer or mill (The "Vulcanaire" has infinite controlled speeds 30,000 to 65,000 R. P. M.)

*Dependably accurate to "tenths"

For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs. *Dependably accurate to "tenths"



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It's built by toolmakers for toolmakers

Then you can finish grind in hardened steel to "tenths" . . . jig grind dowel holes square with a ground base . . . move location of holes in hardened steel blocks . . . jig grind interchangeable holes in hardened sections . . . grind small holes with diamond impregnated mandrels . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . eliminate jig bushings in tools where close spacing is essential.

Other infinitely controlled air driven spindle applications

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

Advantages—10 micro finishes using carbide mills . . . 6 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3 3/4" long motor uses little working space . . . By controlling speed at any point you abolish need for many constant speed spindles.

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the springs was a "poser."

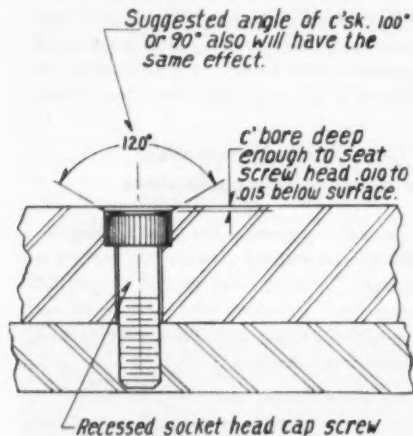
The foreman solved the problem by having the mechanic place the springs on the platen of a vertical sander and with the use of a piece of wood pressing on the spring diameter the parts were reduced in short order. He ground one thirty second of an inch off the diameter of eight springs in less than twenty minutes.

Improving neatness of a surface for socket head cap screws

By H. J. Gerber

Many toolmakers are familiar with the following practice in seating Allen type cap screws into jigs and fixtures; however, the practice is by no means universal.

It is very often necessary to wipe off, periodically, the top surface of jigs or fixtures to remove chips. This can be



quite difficult if the wiping cloth or brush catches on the sharp edge of counterbores into which Allen screws are seated. In our shop we eliminate this by simply counterboring ten or fifteen thousandths deeper than standard and then countersinking a slight amount off the sharp edge of the counterbore. I prefer a countersink with a 120 degree included angle but other angles will do the job also. This leaves a cup shaped edge which eliminates not only the burr thrown up by the counterbore but also eliminates the sharp knife edge. A surface on which all counterbores have been so treated can easily be wiped off with the bare

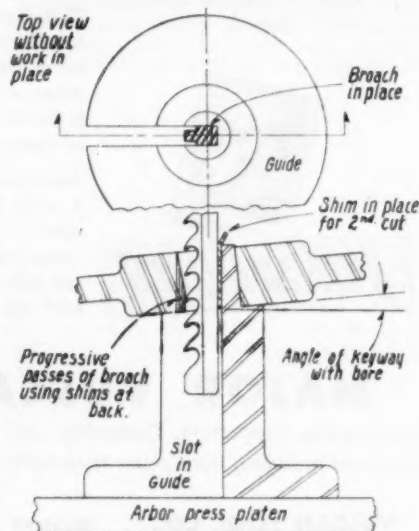
hand. It has become standard practice in our shop to treat all counterbores in this manner.

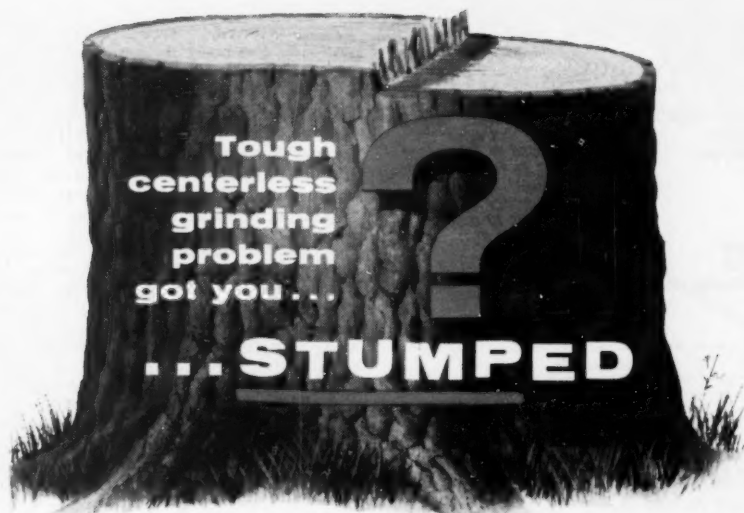
Jig for broaching tapered internal keyways

A tapered internal keyway is sometimes required, possibly for an adjustable saddle key in the hub of a cam. The device illustrated can be easily made to do this rather difficult job quite easily and with little tooling expense.

An ordinary jobbers' keyway broach is very good as a cutting tool. This type of broach usually makes use of a series of bushings to adapt the broach to a large number of bore sizes. Because of the short length of the broach it is usually necessary to make two passes of the broach to complete a keyway. For this purpose there are provided shim strips to seat the broach deeper into the cut for the second pass.

This special taper keyway guide takes the place of the standard broach bushing. The top stem portion of the guide is made to a slip fit into the bore of the workpiece and this part is turned at an angle with the centerline of the lower part of the guide. This angle will correspond to the desired angle of the keyway. The seating shoulder on the guide is made square with the top stem so as to provide a solid support against the down-





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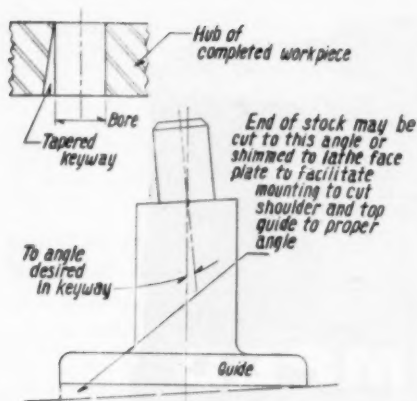
- 1** We've solved hundreds of centerless grinding problems involving high stock removal, good finish, accurate sizing, and high production per dressing, by using the right CINCINNATI Wheels.
- 2** CINCINNATI Grinding Wheels were developed by Cincinnati Milling, which, in the field of centerless grinders, has done more research, had more experience and made more machines than any other organization in the world.
- 3** CINCINNATI Grinding Wheels are based on an entirely new ap-

proach to grinding wheels, the development of the grinding wheel as a true cutting tool, and they represent twenty-five years of Cincinnati Milling research and practical experience.

We are so confident—*so absolutely sure*—that CINCINNATI Grinding Wheels can help you that we make this *unconditional* offer: Either you must be completely satisfied, or we will issue full credit for the CINCINNATI Grinding Wheel used.

So contact us at once. We'll send one of our Cincinnati Milling-trained machinists to show you how to get the most out of CINCINNATI Grinding Wheels . . . and help you solve that tough centerless grinding problem. There is no charge for his service. Write, wire or phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.





ward thrust of the broach.

The slot cut all the way through the

Wire length gage handy, easy to make

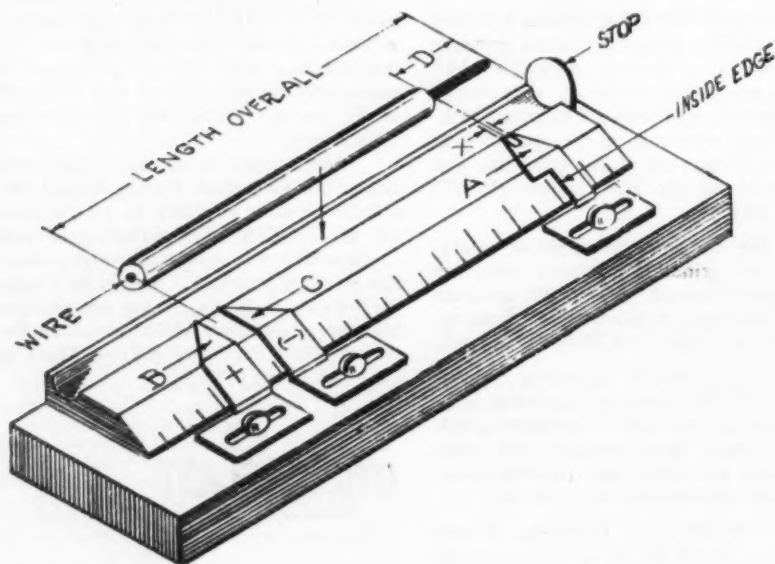
By Henry A. Roy Sr.

This gage is easy to make and very handy to have in any inspection department where a small or large quantity of wire must be checked for the length over all and the length of the bare wire strip of its insulation "D."

guide vertically must be to the same width as the body thickness of the broach. The depth of the slot must be just enough to allow the starting teeth of the broach to begin cutting on what will be the deep end of the tapered keyway. It may be necessary to use several shims instead of one, as is usual, so as to make each pass of the broach cut only one fourth as deep as the keyway is wide.

A good method to use for machining this top stem of the guide at an angle to the body of the guide is to shape off the bottom end of the guide body to the angle desired on the top stem. The guide body can then be secured on this surface to a lathe face plate and the stem and work support shoulder then turned to size. This setup surface can then be machined off square with the true axis of the guide body.

Attach a standard wooden ruler to a wood block. Put a groove in the ruler for the wire to set in. Make three pointers, A, B, and C, of 1/16" thick material. Space "X" in pointer "A" is cut to whatever "D" limits are. For example,



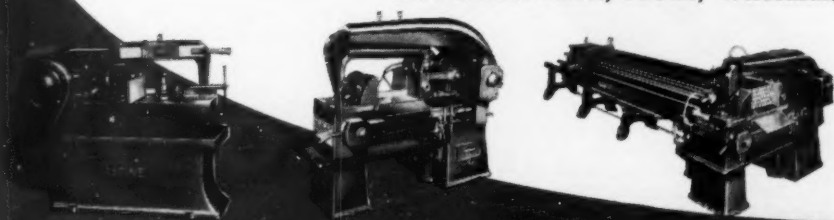


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if "D" is $\frac{3}{8}'' \pm 1/16''$ "X" should be $\frac{1}{8}''$ wide. By setting the inside edge of pointer "A" on $\frac{3}{8}''$ on the ruler, length "D" can be checked.

Pointer "B" is set to the maximum length and pointer "C" is set to the minimum length allowed.

Now, by setting the wire in the groove on the ruler, and against the stop, two important lengths can be rapidly checked by vision.



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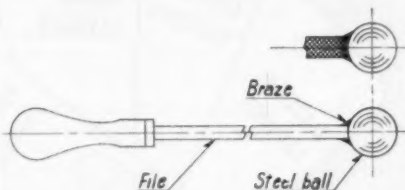
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Grip for file protects hands

By Roger Isetts

When a great deal of heavy file finishing is needed, a toolmaker's hands will become sore from gripping the file end. To prevent this the illustrated idea is



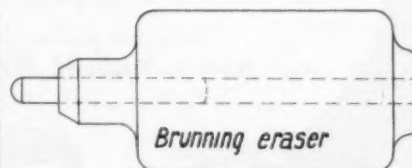
easy to make and will also allow the toolmaker to take heavier cuts than normally.

A round steel ball, the diameter being of a size that fits comfortable in the hand, is brazed directly to the end of the file.

Polishing die impressions

By W. C. Betz

To work out die impressions in jewelry and hardware embossing dies the use of a Brunning electric pencil eraser in conjunction with Bright Boy rubber bond abrasive sticks will be found very useful and rapid.

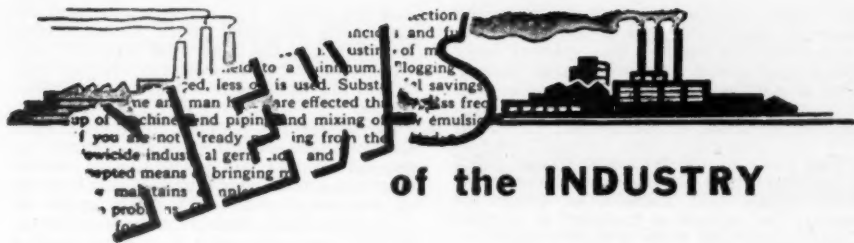


Bright boy sticks

The sticks, as available, fit perfectly in the Brunning eraser holder. The sticks can be shaped with a piece of coarse grinding wheel or an old file.

These sticks can be used by hand but the electric holder is much faster.

Carbide die sections can be polished by using the harder type sticks with diamond dust as abrasive media.



Salesman Employs Unique Homemade Demonstration Unit

MITCHELL BARCHUK, of Nife Inc., Dept. MB, Lambert Ave., Copiague, Long Island, N.Y., Sales Dept., recently finished the first of several demonstration units for showing the Jungner precision universal tool grinding machines, a Swedish product.

Tired of trying to "tell 'em" only, he felt more could be accomplished if he could "show 'em." Now he takes his compact trailer into any building that will admit a car's width and to any floor in the building with an elevator. If the door is too narrow for the trailer, the grinder can be rolled on casters.

The unit is moved from the trailer down a ramp so it can be shown in operation under actual working conditions. The ramp is made of u-beams, fastened to the body of the trailer simply and quickly. Jacks welded to the beams are adjustable to allow for differences in ground contours, in case the unit must be taken from



the trailer outside. Jacks at the front and back of the trailer swing up out of the way when not needed. The grinder itself fits snugly into a base with large casters. The whole is eased from the trailer and down the ramp by means of a small windlass at the front of the trailer.

The body of the trailer is made of $\frac{3}{4}$ " marine plywood rigidly strengthened with steel straps and anchors at points of strain. The outside is trimmed in natural finish hardwood with a darker stain on the plywood. The chassis and axle assembly are all welded, as are the supports and locking lugs for holding the grinder rigid in transit as well as protecting from theft. The trailer as well as the grinder can be locked.

Four windows are around the top of the demonstration unit affording a good view of the grinder without unlocking the trailer.

In approximately a minute, the grinder assembly can be moved out of the trailer ready for action, or returned, ready to travel, all parts fitting in the trailer in their places. Barchuk says he notices very little difference in driving with or with-

out the trailer. Since the trailer and car are easily detached, with an adjustable screw jack at the front near the hitch, and two more in rear, he leaves the unit and drives off without it whenever desirable.

Some features claimed for the Jungner tool grinders include: Nearly all tools are ground against the cutting edge, which eliminates both over-heating and burring of the edge; the exact pitch angle on milling cutters, reamers, etc., can be set directly by means of a two-point reading with the dial indicator; all critical dimensions are measured in thousandths of a millimeter; every desired angle can be set directly on easily read scales; in most cases the tool is held in the dividing head in the same way as in the machine in which it is used; the dividing head can be rotated through 360° in both vertical and horizontal planes; the grinding head can be set in any desired position along the entire length of the table; in addition to tool grinding, the machines can be used for internal grinding, cylindrical grinding, surface grinding, etc.; extremely complicated grinding jobs can be dealt with, since the machines can be equipped with special accessories.



Fray moves to new plant

Fray Machine Tool Co. has moved its manufacturing-engineering services and main offices to a new, modern plant at 2935 North Ontario St., Burbank, Calif.

Covering approximately 20,000 square feet, the plant will provide additional shop space for increased output of the company's line of universal-type milling machines and attachments. Actual setups of milling machines and attachments can be demonstrated in the display room.

The new location provides for increased



inventory storage space and room for future expansion of existing facilities.

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Bryant Chucking Grinder Co., Springfield, Vt., manufacturer of internal grinders and boring machines, announces the opening of three new sales offices at the following locations: Mt. Vernon, N.Y., 35 Beechwood Ave., Nick A. Leyds, dist. mgr.; Dayton, Ohio, 132 North Main St., Caleb C. Brown, factory rep.; Indianapolis, Ind., 2037 East 46th St., Walter Augusten, director.

The Lodge & Shipley Co., Cincinnati, Ohio, acquired through merger The

Columbia Machinery & Engineering Corp. of Hamilton, Ohio.

Directors who will serve on the board of Lodge & Shipley are: Joseph V. Delaney, William L. Dolle, George E. Fee, Walter F. Grote, Thomas T. Kling, Lawrence H. Kyte, Allen W. Merrell, Ralph W. Miller, J. Herbert Myers, James B. O'Donnell, John R. Queen, Alfred Schwarzenbach, James A. Walsh and Louis B. Weber.

Operations will be continued at both Cincinnati and Hamilton without inter-



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ruption and no change will be made in management or personnel. The Hamilton plant will be changed in name to Columbia Division of The Lodge & Shipley Co.

Edgar G. Seybold, president of Hendey Machine Co., Inc., Torrington, Conn., has announced the resignation of Helge G. Hoglund as vice-president in charge of sales, the retirement of Frank J. McCarty as general sales manager, and the promotion of Charles A. Torsen to general sales manager in charge of all sales activity for the company.

Borolite Corp., Niagara Falls, N.Y., recently formed by Firth Sterling Inc., American Electro Metal Corp., and The Carborundum Co. to develop and manufacture various metal borides for high temperature military and civilian applications, has named the board of directors and officers of the new company. General Clinton F. Robinson, Carborundum's president, was named a director and president of Borolite Corp. Kenneth D. Mann, president of Firth Sterling Inc., Pittsburgh, and Dr. Paul Schwarzkopf, president of American Electro Metal Corp., Yonkers, N.Y., were both elected vice-presidents and directors. Other di-

rectors of Borolite Corp. are: Frank W. Glaser, vice-president of American Electro Metal Corp.; Edwin R. Broden, executive vice-president of Carborundum; H. C. Martin, vice-president, research, Carborundum; and Edwin B. Forse, vice-president of The Carborundum Co. Secretary is Edward A. Montgomery, secretary and general counsel of The Carborundum Co.; and Willis T. Windle, Carborundum's treasurer-controller, was named treasurer-controller of Borolite.

Nobur Mfg. Co., Burbank, Calif., have announced appointment of the following as manufacturer representatives: Arthur S. Darling & Assoc., 14716 Mayfield, Detroit 5, Michigan, Territory—state of Michigan; J. J. Ricketson, 7914 W. 77th St., Overland Park, Kan., Territory—Kansas, Nebraska, Iowa, Missouri; the James Morton Co. Ltd., 126 Main St., Galt, Ontario, Canada, has been appointed exclusive Canadian distributor.

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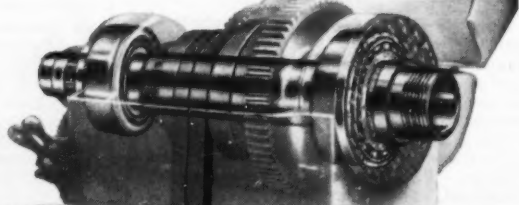
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No lathe can be more accurate than its spindle bearings. Hence before buying any lathe one should check the exact type and tolerances of bearings used!

All SHELDON Precision Lathes have "Zero Precision" Taper Roller Bearings, held to tolerances of .00015"—more accurate than the bearings found in most lathes. They are also the sturdy type that hold their accuracy thru long, hard use . . . hold it even under abuse. With the other stamina features built into SHELDON Precision Lathes, they assure continued accuracy, without costly maintenance, thru years of hard service.

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New Hand-Operated Di-Acro Press Brake

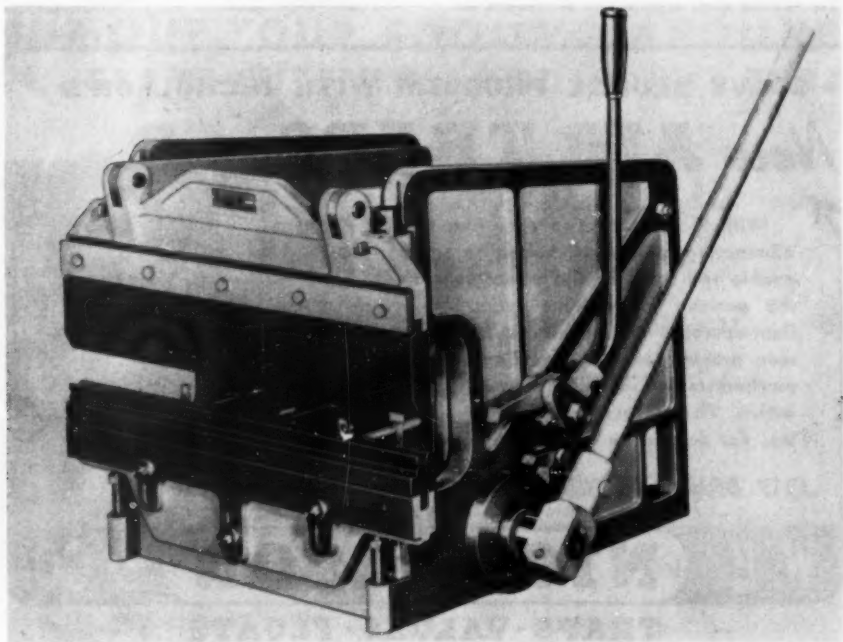
A NEW 24" HAND-OPERATED press brake, rated at eight ton capacity, has been announced by O'Neil-Irwin Mfg. Company, 562 Eighth Ave., Lake City, Minn.

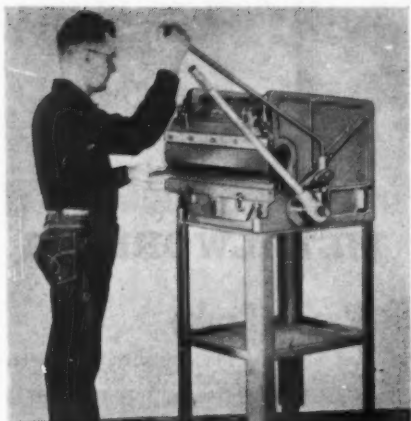
This machine incorporates a special cam lever mechanism which provides ample power for forming, blanking, piercing, drawing, and trimming operations plus a ratchet drive system that greatly multiplies the power for heavy forming jobs.

It was primarily designed to relieve large production models of short run forming operations, yet it is said to form 16 gauge mild sheet steel across the full

24" forming width, 10 gauge mild sheet steel across a 12" forming width as well as inconel, brass, aluminum, stainless steel, chrome molybdenum and all other ductile materials.

Other features and specifications: Width of stroke, 24"; stroke of ram, 2"; depth of throat, 6"; width between housings, 14";





bearings, Torrington roller; ram guides, hardened steel and precision ground; bed adjustment, 1½".

The brake is available with a complete line of standard dies and specials. All dies are interchangeable with other standard press brakes.

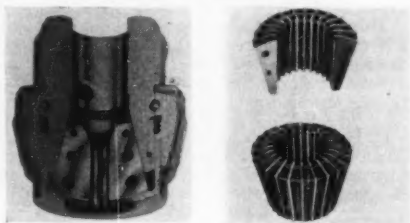
Use ACTION Card, opposite page 64. Encircle No. 1

Jacobs Model 96 collet chuck

Model 96 collet chuck is a new tool-holding and work-holding chuck which now permits the use of the famous Jacobs Rubber-Flex collets on many different machine tools throughout the shop.

This new Model 96 is said to provide outstanding collet performance on grinders, milling machines, jig borers, jig grinders, lathes and various types of special machinery where a precise compact collet closure is desirable.

The chuck is made in two models whose only difference is in their back mounts. Model 96-05 is equipped with a No. 5 Jacobs taper back mount while Model 96-F1 has a flange mount. Both have a one-piece hardened steel body. A conical

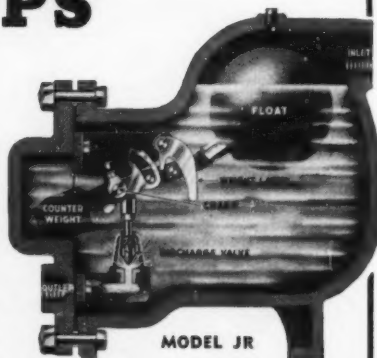


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New AIR TRAPS

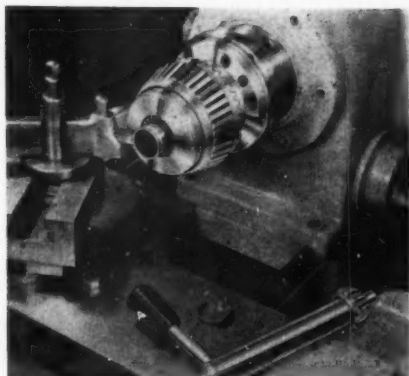
With the introduction of a new oil-eliminating feature, Nicholson air traps enable you to enjoy the advantages of the positive intermittent action of a float-operated air trap without the common problem of oil congealing on the mechanism and impeding or stopping its action. Three types; pressures to 1500 lbs. For details send for . . . CAT. 953

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bore in the front of the body accurately centralizes the Rubber-Flex collets. Mounted on the body by means of a deep-groove ball bearing is a hardened steel geared sleeve having a ground threaded bore which is threadedly engaged with the collet closing nose of the chuck. This nose is made of a hardened steel and all working surfaces, including

the threads, are ground. Rotation of the chuck sleeve for initial engagement of the part to be held is accomplished by hand rotation of the sleeve. Final locking is effected by clockwise rotation of a geared key supplied with the chuck.

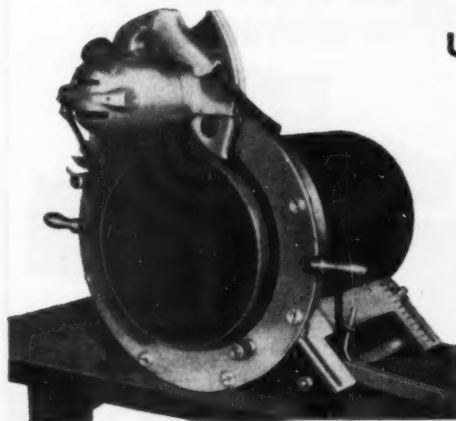
The chuck is normally used for gripping bright finished metal bars; but because the Rubber-Flex collets used have an unusual range of capacity, it is also adapted to hold resilient and compressible materials, such as rubber, plastic and wood. A further use is the gripping of delicate cylindrical pieces, such as thin-walled tubing of metals, wood, or plastics, and brittle materials such as ceramics and glass.

It is particularly useful on jig borers, cylindrical and cutter grinders, high precision machines, for drilling and reaming operations, the holding of proving bars, indicators, and the like.

This chuck will hold any diameter round bar between $1/16"$ and $1\frac{1}{2}"$ by using its eleven Rubber-Flex collets each of which has a range of $1/8"$ except the smallest (J-910) whose range is $1/16"$. Jacobs Manufacturing Co., Dept. B, West Hartford 10, Conn.

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- ★ Portable
- ★ Under \$500 for
12" Capacity

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WALLACE TUBE CO.

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Chicago 14, Ill.

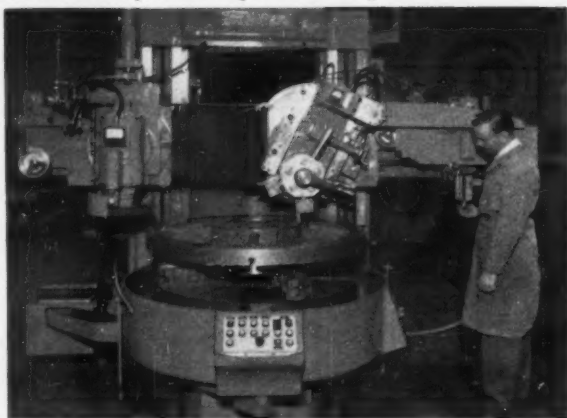
Dealers Inquiries Solicited

Turning, grinding machine developed for jet industry

A new precision turning and grinding machine developed especially for the jet engine industry, but applicable to any work on which exceptional tolerances are required on concentricity and parallelism of turned and ground surfaces, has been announced by the Frauenthal Div., Kaydon Engineering Corp., Dept. B, Muskegon, Mich.

Designed to perform multiple turning or grinding operations in one set-up, the versatile new 3100 series machine is manufactured by the firm which makes the 1800, 2000 and 2200 Series Frauenthal double-head precision grinders. The 3100 series includes four table sizes—36", 42", 48" and 52", all with a 60" swing.

Among the many unique features of the 3100 Series machine is the work table



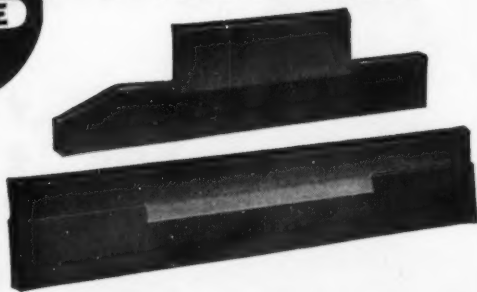
arrangement. Power for driving the work table is provided by a 10 hp direct-current drive unit, with power transmitted to the table spindle through a "timing" belt.

The work spindle pulley is ball bearing



Standard thrufeed and in-feed work support blades available from stock. Prices on special blades quoted on receipt of prints.

CARBIDE TIPPED *Work Support Blades* **for CENTERLESS GRINDERS**



SPECIAL TOOLS — Prompt quotes on receipt of prints

WILLEY'S CARBIDE TOOL CO.

SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway

Detroit 1, Michigan

mounted in a heavy housing, bolted to the lower area of the base. All radial load on the pulley is taken on its own bearings, and is not transmitted in any way to the table spindle. The belt drive was found to provide a better surface finish. All other movements have their own power source.

The table on the 3100 Series is seated on, and securely bolted to a large-diameter flange on the spindle. The spindle assembly is a self-contained unit.

The dc drive on the 3100 Series provides infinitely variable, electronic potentiometer-controlled table speed up to 175 rpm, or in higher speed ranges to meet customer requirements. Dynamic braking of the table and jog button control are standard equipment.

All horizontal and vertical feeds are hydraulically actuated to provide infinitely variable feed rates. Versatility of the 3100 Series makes it suitable for tool and die work, and experimental departments.

Optional equipment has been designed to cover a wide range of work from

**SAVE
3
WAYS
WITH A
LUCIFER
ELECTRIC FURNACE**



1 SAVE with a Lucifer Electric Furnace on **FIRST COST**. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces . . . feature by feature . . . you'll save money on the Lucifer Electric Furnace **EVERY TIME**.

2 SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed - Lucifer controls are **EXACT**. They reach **SPECIFIED** heat rapidly and retain **SPECIFIED** temperature without variation. No special experience required when you use a Lucifer Furnace.

3 SAVE on maintenance expense with a Lucifer Electric Furnace. Finest refractory materials are built into Lucifer Furnaces for better, more efficient heat retention. Elements are guaranteed, long lived, trouble free. More than two thousand satisfied users.

CHECK THESE PRICES

Furnace Size	2000'	2300'
6x 6x12"	\$ 467.00	\$ 548.00
9x 9x18"	647.50	764.00
12x12x24"	912.00	1068.90
18x18x36"	1419.75	1629.50

Complete with 100% automatic electronic controls.

WRITE FOR FREE LITERATURE, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

LUCIFER FURNACES, INC.

Neshaminy 1, Pa.

Phone Osborne 5-0411

Successors to Gilbert S. Simonski Company

production operations to job shop requirements. A wide variety of grinding spindle designs are available either as an accessory or in place of the direct connected spindle furnished as standard equipment. These include belt-driven and other type spindles for small-bore grinding, deep-hole grinding, etc. Hydraulically actuated straight, radius and combination radius-angle dressers are avail-

able and special dressers can be furnished for almost any application.

Also available as optional equipment on the 3100 Series is the Frauenthal constant (sfm) control, an electronic device that automatically compensates the table speed to maintain constant surface feet when taking wide facing cuts.

Use ACTION Card, opposite page 64. Encircle No. 3

"U.S." No.1

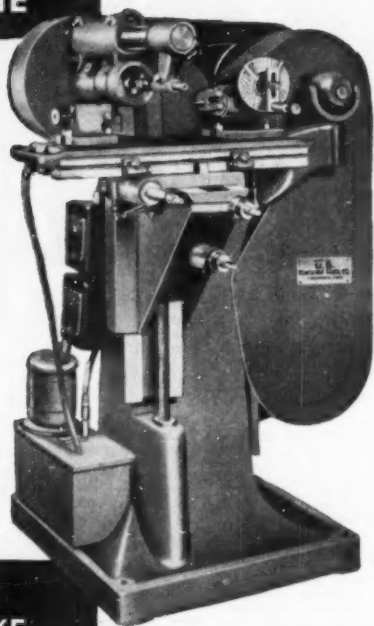
HORIZONTAL MILLING MACHINE

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America's
Number One
Low Cost
Miller.

A Rugged
precision
hand-miller
easily
adapted to
high-speed
hand or
power-fed
production.

Send for
complete
data on
specifications
and
accessories.



THE
U. S. BURKE
MACHINE TOOL DIV.

★ ★ ★ ★ ★ ★ ★

Brotherton Road 1, Cincinnati 27, Ohio

Four new models in turret lathes announced by Warner & Swasey

A new line of heavy duty saddle type turret lathes has been announced by The Warner & Swasey Co., Dept. B, 5701 Carnegie Ave., Cleveland Ohio.

The new machines follow in size the company's present 1A, 2A, 3A and 4A lathes, but incorporate important design changes.

Chief new features are increased power, enabling faster removal of metal; a wider range of speeds, permitting better adjustment to the requirements of the work to be done; and automatic gear shift controls which provide easier, faster and more efficient operation.

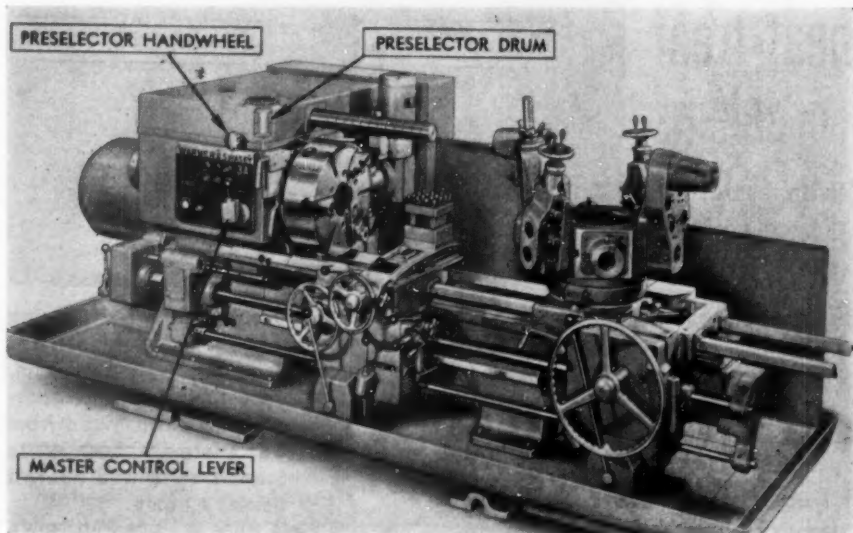
Power has been increased to 30 hp on the 1A size, 40 hp on the 2A size, 60 hp on the 3A size and 75 hp on the 4A size. This represents an increase in top horsepower of approximately 50%.

Spindle speeds on all four models have been increased from the conventional 12 to 16. Provision has been made for higher speeds, lower speeds, and more and better speed grouping in the natural working range of the machine. If more versatility is needed, a two-speed motor will furnish 32 different speeds.

All four new models have direct acting hydraulic clutches that are free from any mechanical linkage, need no adjusting,

and have direct reading preselectors.

In the new heavy duty 2A, 3A, and 4A models, headstock gear shifting is done by hydraulic pistons. All shifts are automatic and are completed in two to five seconds. The heavy duty 1A changes



speeds without gear shifting through hydraulic clutches on the gear train, with the gears always in mesh and speed changes therefore rapid.

Streamlining of the new models was developed by Henry Dreyfuss, functional stylist of industrial equipment.

The 3A, designed as the M-3500 machine, is available with either 4½ or 6" round bar capacity. The effective swing is 23½". The 4½" capacity spindle has an 11" American Standard flanged nose and the 6" capacity spindle has a 15" American standard flanged nose.

The new headstock is a 16-speed hydraulic shift preselector head. Four speeds have been added to give a speed range of 35½ to 1, as compared to 26 to 1 on the company's present 12-speed 3A M-1950 machine. With a two-speed motor 32 unduplicated speeds can be preselected, ranging from 12 rpm to 851 rpm. Available maximum horsepower has been increased 50% and top speed 35%.

To shift gears, the operator is required to: (1) set the desired speed, in surface feet per minute, with the preselector knob and preselector drum which shows

both surface feet per minute and R.P.M.; and (2) push the master control lever in toward the headstock. The following sequence then takes place automatically within the headstock:

1. The headstock gear train is immediately slowed to a crawl speed by the braking action of the crawl clutch.

2. The hydraulic pressure is then directed to the proper shift cylinders as determined by the preselector valve which was actually set by the operator when he selected his new speed.

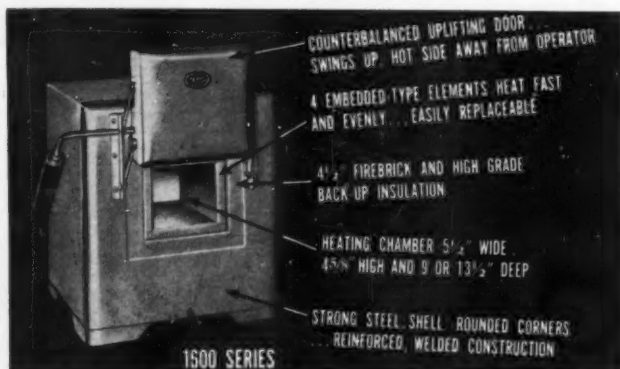
3. The shifting of the gears is then accomplished hydraulically without any effort or attention on the part of the operator who may be indexing and traversing the hexagon turret in preparation for the next cut.

4. Upon completion of the shift the master control lever is automatically snapped "out" to the normal run position and the spindle again revolves at the new preselected speed.

The cross slide and hexagon turret are equipped with new design rapid traverse units requiring less operator effort and which are said to be easier to adjust and maintain. The power rapid traverse on

solve heat-treat problems

with versatile
Temco bench-
type furnace



Step up production, cut costs with Temco electric furnaces for heat treating dies, parts, tools, etc. Model illustrated above one of eight convenient sizes available with either electronic or manual temperature controls. Economical,



ELECTRIC FURNACES

THERMO ELECTRIC MANUFACTURING CO.

easy to install and operate, low cost. Priced from \$55.00 to \$507.50. Write for literature and nearest dealer's name.

486 HUFF ST., DUBUQUE, IOWA

the cross slide provides both longitudinal and transverse movement.

Head and gear boxes have been redesigned to incorporate anti-friction bearings with automatic oil supply. The pans have been redesigned to accommodate the larger sumps required for the new hydraulic system and the larger headstock and to provide more chip capacity. The new beds, saddles, carriages and aprons are designed to provide rigidity, strength, and accuracy compatible with the increase in horsepower and speeds. The hexagon turret locating and clamping mechanism has also been redesigned to provide a more powerful toggle action and greater holding power of the hexagon turret clamp.

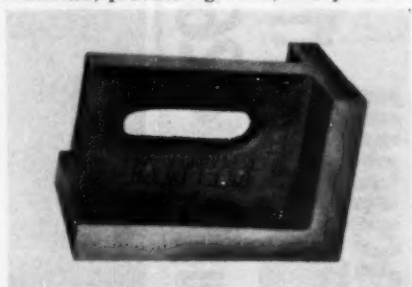
These features of the new 3A will be incorporated in the new 2A and 4A machines coming off the line later this year. The 2A and 4A are a smaller and larger model, respectively, of the 3A. The fourth new machine, the 1A, a still smaller size of the saddle type turret lathe, is similar to the others with the exception that the spindle and all shafts in its power train will be equipped with hydraulic clutches and constantly meshed gears.

Use ACTION Card, opposite page 64. Encircle No. 4

Six-way right angle irons

Steeltion Co., Dept. B, 630 W. 17th St., Costa Mesa, Calif., has announced that they now have ample stock of conventional size six-way right angle irons and angle plates for quick delivery.

These are made of aged, heat treated materials, precision ground, and polished



to within .0005 of an inch in six inches. They are said to be time savers when used for precision inspection and setup on mills, jig boring, etc.

All matched pairs are precision ground together, for positive size duplication.

Use ACTION Card, opposite page 64. Encircle No. 5

STOP DUSTS INSTANTLY

with

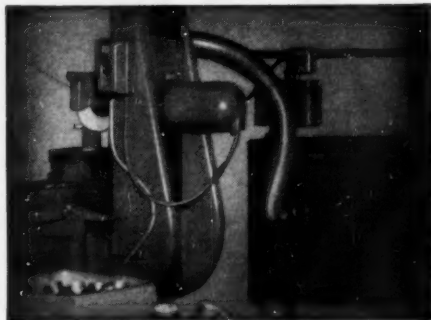
DUSTKOP

Available from stock of 32
standard models

300 cfm to 10,000 cfm

for: Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Equipment . . . DUSTKOPS collect almost all kinds of industrial dusts.

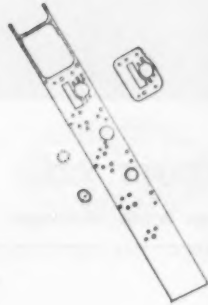
Ask for Catalog 605-3. Describe dust problems for recommendation by return mail — no obligation.



AGET-DETROIT CO.

502 Main St. Ann Arbor, Michigan

This **HURON** Lamination Die
Gave Initial Run of **426,000!**



LUDLUM HURON high-carbon, high-chrome die steel was the material used in this motor lamination die. Here was the result when the die was run on a 45-ton Bliss press at 210 strokes a minute:

- 1 Initial run was 426,000 pieces
- 2 Average run since has been 250,000 pieces
- 3 Although burr tolerance is .003", grinding of punch and die between runs has not exceeded .008"

LUDLUM HURON WAS SELECTED because of its known high resistance to wear, especially under heavy pressures, and its excellent non-deforming qualities. Because Huron is an oil-hardening steel and hardens uniformly to a great depth, a consistent production rate after each grind was assured.

There's an A-L Tool Steel that will help solve your cutting, forming or blanking problem. Call our nearest office or distributor today, or write *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pennsylvania.*



For complete **MODERN** Tooling, call
Allegheny Ludlum

W&D 8187



Write for BLUE SHEET on HURON

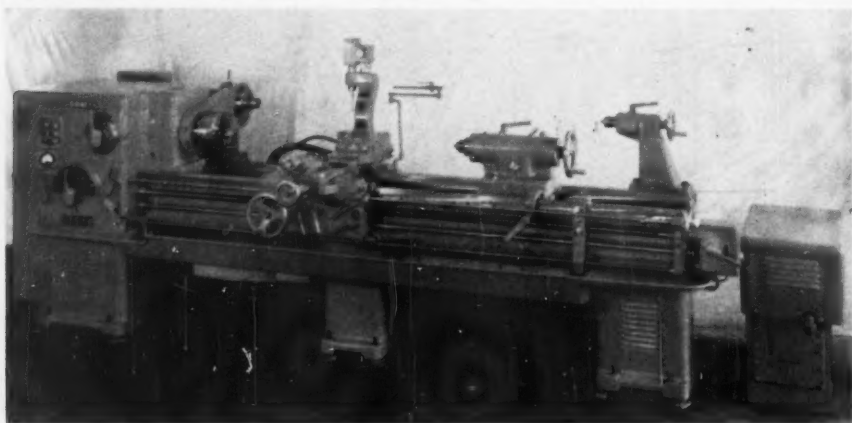
This concise four-page folder gives all needed handling and shop treatment details on Huron. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. *Ask for your copy.*

Address Dept. MB-54

Sidney Fluid Tracer lathe now available with rotating drive for template

In order to further increase the versatility of the Sidney Fluid Tracer lathe the addition of a rotating drive for the template has been developed for use in

work where radial contours as well as axial contours are required according to a recent announcement by The Sidney Machine Tool Co., Dept. MB, Sidney,



FOR ALL WET-BLAST EQUIPMENT!

PRESSURE BLAST ABRASIVES



Write for further information and the name of your nearest Pressure Blast distributor.

★ Developed by the manufacturers of Pressure-Blast wet-blasting equipment.

- ★ EASIER TO AGITATE!
- ★ WILL NOT PACK!

75-5000 mesh range including aluminum oxide, quartz, silica flour, novaculite, garnet, etc.

Emulsifiers and inhibitors compounded with the abrasive . . . ready to use . . . no additives to buy or mix.

For use in all makes of wet-blast equipment.

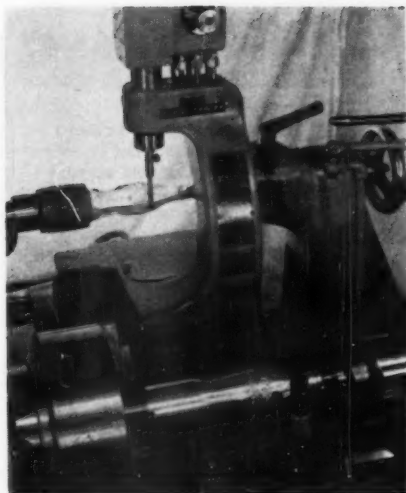
Packaged in sturdy, fiber-board drums . . . 50 lbs., just right for a single operating charge.

Available from stock in all principal cities of U.S. and Canada . . . no freight charges.



the CRO-PLATE Company, Incorporated

747-7 Windsor Street
Hartford 5, Conn.



Ohio.

The accompanying photographs illustrate the 16" Model 32 lathe with this additional feature. The template drive con-

sists of a 1:1 ratio between the work piece and template. As the stylus follows the template contour longitudinally it will also, with the rotating template drive, reproduce whatever radial contour is incorporated in the master by transmitting these variations in contour to the cutting tool.

The addition of the rotating template drive does not in any way inhibit the use of the standard tracer control nor the convenience in converting the tracer controlled lathe to standard lathe operations without the addition or removal of parts or assemblies.

Use ACTION Card, opposite page 64. Encircle No. 6

Revolving deep hole drilling tool and unit

Boyar-Schultz Corp., Dept. B, 2108 Walnut St., Chicago 12, Ill., announces a new deep hole drilling tool and unit.

Incorporating all the features of the present tool, including the oscillating action, the new tool revolves to add additional rpm for smaller diameter drills. A .050 drill is said to go into the work 16 times its diameter, without a pullout.

The compact V-belt drive unit with variable speed pulleys can be mounted



Write today for literature on complete line of Huppert furnaces and ovens in floor and table models.

(Also available in stainless steel at slight additional cost.)

For Heat Treating Small Parts

HUPPERT

DeLuxe ELECTRIC FURNACES

Here's a series of compact, durable furnaces that are ideal for tool and die shops and small laboratories. Any desired temperature within the range of 300° to 1900° F. is controlled by an accu-

rate, built-in Huppert temperature controller. All-steel construction—multi-insulation—sturdy Kanthal elements—counterweighted doors—removable porcelain tray.

Model No.	Inside Dimensions			Temp. Range	Watts 110 Volts AC	Price
	Wide	High	Deep			
2DL	4 1/4"	3 3/8"	4 1/2"	300° - 1600° F.	900	\$ 80.00
22DL	4 1/4"	3 3/8"	9"	300° - 1600° F.	1700	110.00
4DL	4 3/8"	3 3/4"	6"	300° - 1900° F.	1700	110.00
5DL	4 3/8"	3 3/4"	9"	300° - 1900° F.	1700	172.00
9DL	6"	6"	6"	300° - 1900° F.	2200	200.00
669DL	6"	6"	9"	300° - 1900° F.	3000	248.00
10DL	8"	4"	6"	300° - 1900° F.	2200	215.00
849DL	8"	4"	9"	300° - 1900° F.	3000	265.00

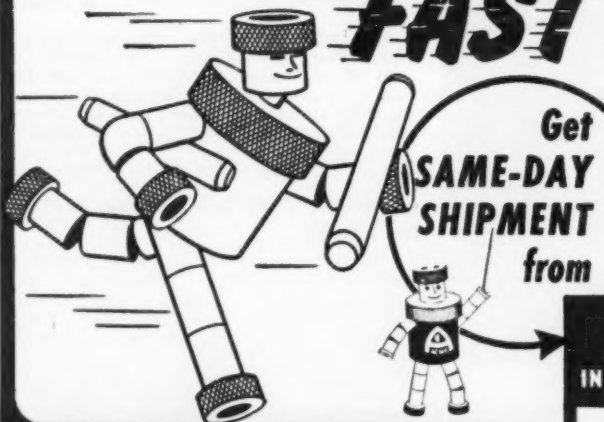
Available for 220 Volt AC at small additional cost. Stainless steel housing slightly higher.

K. H. HUPPERT COMPANY
6845 Cottage Grove Avenue Chicago 37, Illinois
Manufacturers of Electric Furnaces and Ovens

When you need
precision steel

DOWEL PINS

FAST



Get
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● Order from Acme's huge stock of standard nominal and oversize Dowel Pins... shipment made within 24 hours. Whether you need a few, or many thousand, packaged or bulk, Acme can supply them FAST! Special sizes ground from semi-finished stock to fill any dowel pin requirement. Send for details now!

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MFRS. OF STANDARDIZED DRILL JIG AND FIXTURE BUSHINGS

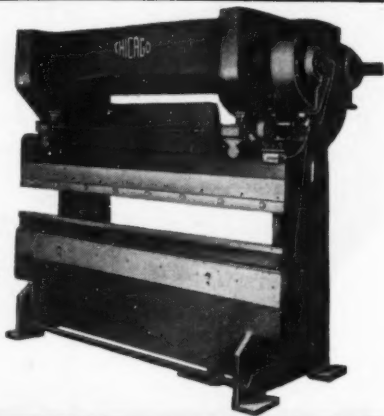


STEEL PRESS BRAKES

43 Standard Sizes

Readily adapted for a wide variety of bending, forming, drawing, notching, blanking, punching, embossing, etc.

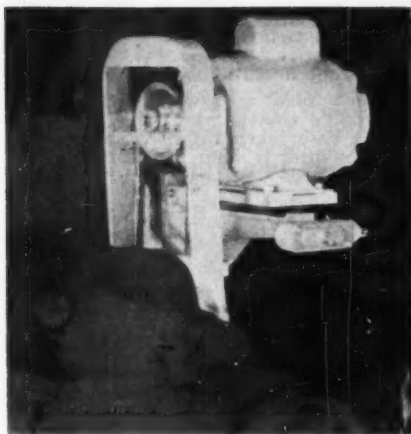
DIES Complete Line of Induction Hardened Dies for All Makes and Sizes of PRESS BRAKES.



DREIS & KRUMP
MANUFACTURING COMPANY

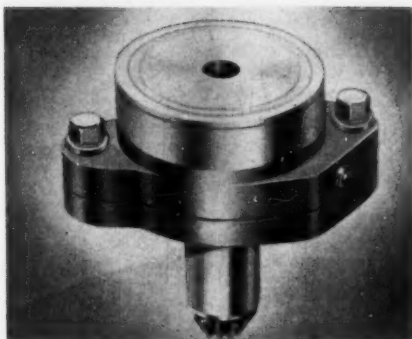
7440 S. Loomis Boulevard, Chicago 36, Illinois





on No. 00, No. 0 and No. 2 automatic screw machines in a matter of minutes. No machining of any kind required for mounting.

The drive allows free and easy movement of the turret slide without binding or jamming.



Designed primarily for use with both Boyar-Schultz revolving and non-revolving deep hole drilling tools, the driving unit can also be used for other tools requiring power from the screw machine turret.

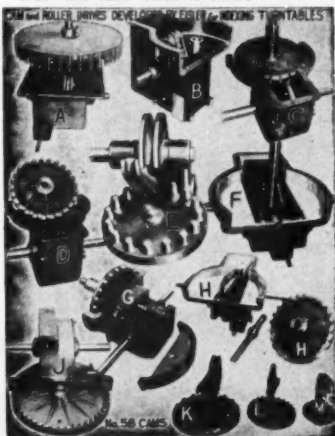
Use ACTION Card, opposite page 64. Encircle No. 7

Versatile steel number stamp

A versatile device for marking numerals in nameplates, forgings, and products of metal, plastic, fiber, and wood is the Acme Numer-8. It can be used for serial numbering from zero to 999,999 or for repeat-

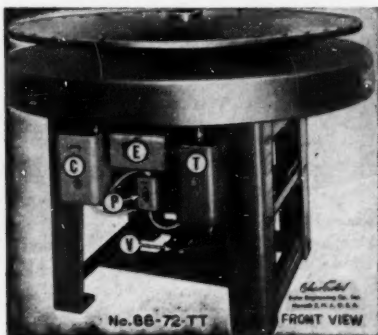
INDEXING TURNTABLES AND POSITIONERS

Eisler makes over 100 different types for welding, brazing, soldering, spraying, glass insulators, molting and glass glazing, with rotating stations and motorized or hand operated. Rotating tables of all kinds for over 35 years. We supply any part or complete equipment and we make special turntables to your order and cams made to order.

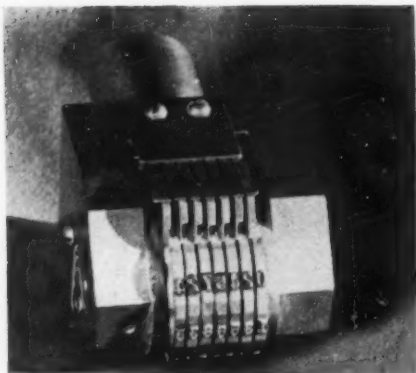


A SPECIALIZED CAM MILLING SERVICE, SPOT AND BUTT WELDING

C
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M
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DR. CHAS. EISLER M.E., PRES.
EISLER ENGINEERING CO., INC., 762 So. 13th Street, Newark, N. J.



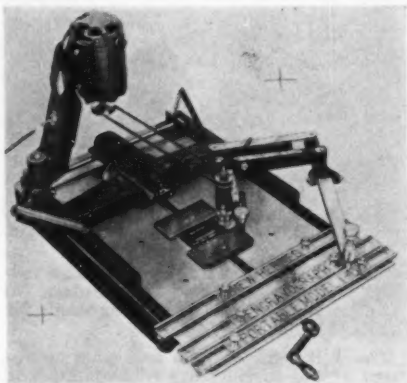
ing a number or succession of numbers as often as desired. It is suitable for use by hand or in machines. Shown here is the machine model equipped with a standard cylindrical shank for use in power presses, motorized marking machines, and hand and foot operated machines. The hand model has a flat shank and specially tempered striking head.

Simple design and small number of moving parts are features. Acme Marking

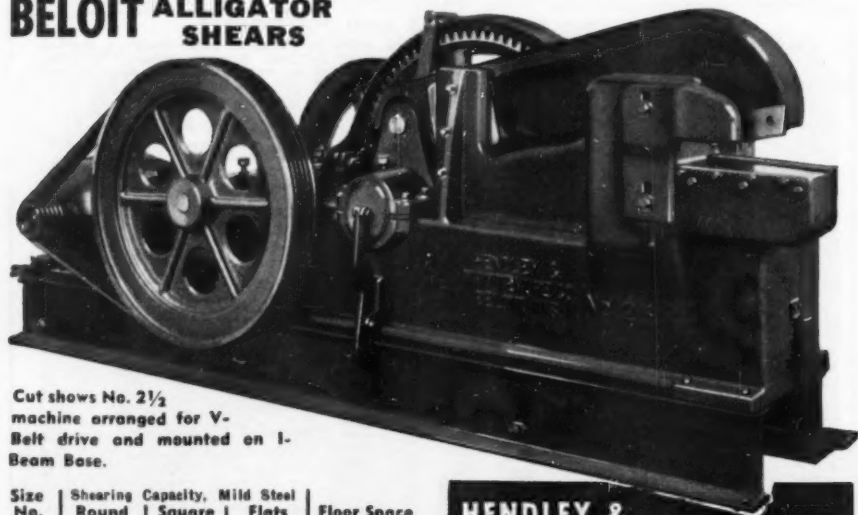
Equipment Co., Dept. B, 8030 Lyndon, Detroit 38, Mich.
Use ACTION Card, opposite page 64. Encircle No. 8

Engraving machine

A new small engraving machine, with a portable chassis which may be lifted off the base, taken anywhere in the plant and set directly onto the work surface, has just been developed for industry by



BELOIT ALLIGATOR SHEARS



Cut shows No. 2½ machine arranged for V-Belt drive and mounted on I-Beam Base.

Size No.	Shearing Capacity, Mild Steel				Floor Space
	Round	Square	Flats		
2½	2½"	2¼"	8"x1"		122"x65"

Smaller sizes available. Tell us your shearing needs.

Write for Prices

**HENDLEY &
WHITEMORE CO.**
100 Blackhawk Blvd. Beloit, Wis.

New Hermes Engraving Machine Corp., Dept. B, 13-19 University Place, New York, N. Y.

The new unit, Model I-L, is said to be more compact than other models, designed for the engraving of panels, dials, name plates, signs, and similar items, and even large instrument panels; Model I-L is no larger than a typewriter.

It has a quick-acting work holder which clamps any size panel of steel, plastic or wood, and adjustable copy holding slides; an operator may engrave a name plate

with several lines by simply adjusting the slides to any spacing desired.

Use ACTION Card, opposite page 64. Encircle No. 9

Wysong adds three new features to 5" rolls

Wysong and Miles Co., Dept. BB, 652 Fulton St., Greensboro, N.C., has announced the addition, as standard equipment, of three new time-saving and safety features on Wysong Series 'C' all-steel five inch rolls.

Fast, parallel adjustment of the rear roll by means of a single hand-wheel

Atlantic WAVY SET BANDS

GANG CUT... BAR STOCK

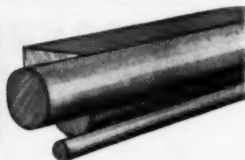
On the toughest metal cutting jobs, Atlantic Wavy Set Bands always deliver faster, more accurate "gravity fed" machine cutting — bite through hardened steel in seconds flat — leave score-free, finished surfaces. Here's the secret behind this vastly superior performance: Atlantic special design band with a wave of teeth to the left, then to the right, sweeps away chips as it cuts — provides cool, free operation throughout prolonged blade life.

FREE!

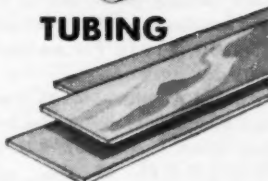
Send today for the graphic story of Atlantic's family of fine saws.



Atlantic
ATLANTIC SAW MFG. CO., Inc.
Brewery Street New Haven, Conn.



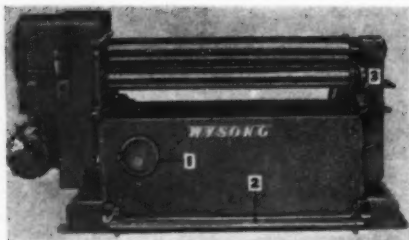
TUBING



THIN SHEET STOCK



EVEN I BEAMS
TO THE DESIRED LENGTHS
ON THE SAME MACHINE
IN LESS TIME!



located on the front of the machine; indicator scales clearly visible from the front, saving steps and setup time.

A safety treadle extends the full length of the front of the machine. Depressing the treadle from any position immediately breaks the electrical circuit and stops the machine. Circuit remains broken until machine is reactivated at push button station.

The top-roll raises automatically with the lowering of the drop-end. A single lever provides a simple means for releasing the drop-end for lowering. On rais-

SIGOURNEY

M-100

THE PRECISION BENCH DRILLING MACHINE

ACCURATE because table and column exactly squared one to the other.

LONG LIFE because of hardened and ground spindles.

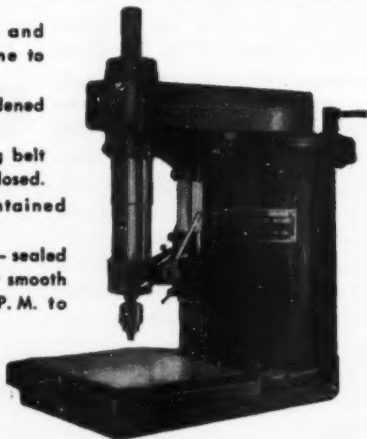
SAFE because motor, driving belt and spindles are entirely enclosed.

STRONG, RIGID for maintained accuracy.

SMOOTH AT HIGH SPEEDS — sealed ball bearings throughout for smooth operation from 4000 R. P. M. to 10,000 R. P. M.

MODELS — with 1, 2, 3 and 4 spindles.

Send for illustrated bulletin.



THE SIGOURNEY TOOL CO.

Hartford 6, Conn.

Sole Sales Agent

PRATT & WHITNEY

Division Niles - Bement - Pond Co.

West Hartford, Connecticut

18682

ing, the drop-end automatically locks into position.

These rolls are available in sizes of 36"x3/16", 48"x8 ga., 60"x10 ga., 72"x12 ga., and 96"x16 ga.

Use ACTION Card, opposite page 64. Encircle No. 10

Modernair DU hydraulic pumping unit

The DU Series, Modernair low pressure hydraulic pumping unit is said to be especially designed for use with Modernair components and systems, to provide "on-the-spot" low pressure hydraulic power and volume output, suited to many individual installation requirements. Complete with motor, five-gallon reservoir, breather, dip stick, overload protection and capacitor, relief valve set for 200 psi, and needle bearings for continuous service.



Modernair Corp., Dept. BB, 400 Preda St., San Leandro, Calif.

Use ACTION Card, opposite page 64. Encircle No. 11

INCREASED
TOOL LIFE...
FINER FINISH... HIGHER
CUTTING SPEEDS
...LESS
REJECTS

METAL WORKING PLANTS GET GREATER
PRODUCTION AT LOWER COSTS with...

SAFCO Cutting Fluids

TAILOR-MADE CUTTING FLUIDS TO FIT YOUR NEEDS.

In the comprehensive SAFCO line, there is a correct cutting oil or coolant especially designed for each type of metal and machining operation. This specialized selection makes it possible for our experienced sales engineers to help you choose

the right cutting fluid for your particular job. WRITE FOR FREE LITERATURE—TODAY!
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SPECIFY KASSON PRECISION COLLETS AND ATTACHMENTS

IMMEDIATE DELIVERY FROM STOCK



KLUTCH-KOLLET

Step collet for accurate chucking to 2 1/2" dia. Soft head for easy boring. Lowest price on market! Models 3AT, 3C, 5C.

FOR ATLAS • LOGAN • SOUTH BEND
CRAFTSMAN • SHELDON LATHES, ETC.

LEVER-TYPE DRAWBAR 1/2" cap.



Positive grip on undersize, oversize or standard diameter work! Patented coordinate cams eliminate fingers.

Let us quote on your quantity orders for any type of collet, live center or other machine tool attachment!

HAND DRAWBAR 1/2" cap.



LIVE CENTER
(Ball Bearing) Double sealed for accuracy.

KASSON

Precision

KASSON Precision products are guaranteed unconditionally for accuracy, fit and long life. Your dealer should have them... Write us for literature!

KASSON DIE AND MOTOR CORP.

32-14 Northern Boulevard
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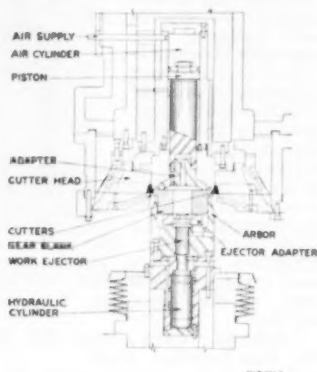
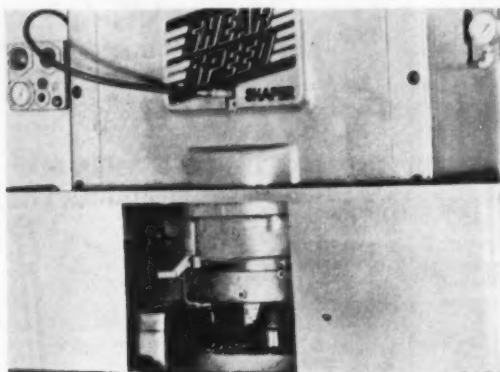
Integrity
Since
1919

Pneumatic work holder, plus hydraulic ejector, cuts production time on shapers

Two new devices are now available on the complete line of Shear-Speed gear shapers built by the Michigan Tool Co., Dept. MB, 7171 E. McNichols Rd., Detroit 12, Mich. One is a pneumatic holding mechanism built into the head of the shaper to allow for automatic positioning

piston is raised against the lower face of the gear to eject it after the cutting cycle is completed.

Only plant air is required in the air cylinder for clamping, thereby eliminating the need for any specialized equipment. No accumulator tank is needed to take



of the gear blank and clamping it in place during the shaping operation. The other is a manually controlled hydraulic device which ejects the gear blank after the shaping operation is completed.

The hydraulic ejector cylinder is mounted integrally with the reciprocating vertical ram which carries the work arbor. An adaptor attached to the hydraulic

care of changing volume.

Cup-shaped sleeve adaptors are fitted into a tapered hole in the bottom of the air cylinder piston. These adaptors fit over the top of the arbor when working on a hole gear, or over the end of the gear shaft, and move down to bear against the upper face of the gear.

Use ACTION Card, opposite page 64. Encircle No. 16

Lucas-Milhaupt edgewound washers reduce silver brazing costs

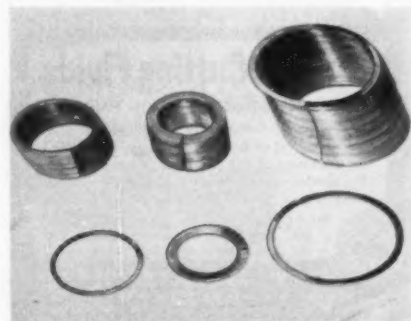
Silver brazing costs are said to be reduced as much as 60% when new L-M edgewound washers are used, according to their manufacturer, Lucas-Milhaupt Engineering Co., Dept. MB, Cudahy, Wis. Through important engineering advances, incorporating the No Tangle-Notch Coil feature, washers are produced without die charges or tooling costs and eliminate scrap waste common to blanking.

Flat wire alloy is wound on edge and then cut partially through. The coil of washers is then shipped intact. When used, each washer is snapped from the coil and preplaced on work as needed. Unused washers remain in coil form.

This method of winding flat wire from standard wire stocks eliminates the usual

lead time for dies and lead time for exact size strip required for blanked washers.

Edgewound washers are suitable for



5" SINE PLATE — \$32.50

10" SINE PLATE \$80

Guaranteed .0002" Accuracy



Rolls Same Diameter0001"
 Top Parallel0002"
 Center Distance Rolls0002"
 Rolls Parallel0002"

**Hand Scraped Roll Seats
 Precision Ground
 Double Normalized
 Satisfaction Guaranteed**

**Immediate
 Shipment**



BALD EAGLE SINE PLATES

Article Number	Center Distance	Width	Length	Shipping Weight	Price of Sine Plate Only	Price of Sine Plate & Oak Case
1605	5"	3"	6 1/4"	6 1/2 lbs.	\$32.50	\$38.00
1610	10"	5"	11 1/2"	23 lbs	\$80.00	\$86.00

Send your order today! Prices F.O.B. St. Paul. Shipment within one working day of receipt of your order.
 Dealer Inquiries Invited

Bald Eagle Tool Company

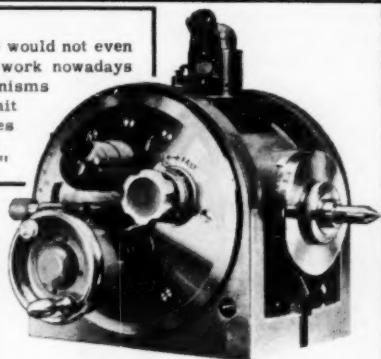
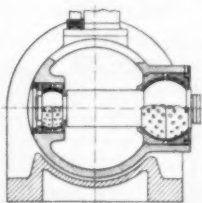
Newton Building, St. Paul 1, Minn.



A CUSTOMER SPEAKS:

"Without our Optical Dividing Head, we would not even attempt to make the critical indexing work nowadays necessary for things that fly, or mechanisms that must control angular motions to hit targets at a distance, to measure degrees, minutes and seconds, to eliminate angular velocity errors and vibrations in quick running mechanisms, etc."

The LEITZ Optical Dividing Head is the last word in indexing precision. Its construction is different from other optical and mechanical dividing heads on the market. A NEW DOUBLE SPHERICAL BALL BEARING, DOUBLE READING IN THE SAME EYEPIECE 180° APART, motor drive attachment and other features make the LEITZ an important aid required in any shop where precision is demanded.



← The 2 spherical ends of the spindle are carried in hardened steel cups with several hundred small precision balls held in place by ball cages in such a way that each ball creates its own path. There is no play, either radially or axially, no oil film, no wear and a very large load capacity.

Write for Descriptive Bulletin

Geo. SCHERR OPTICAL TOOLS, Inc.

200-MT LAFAYETTE ST. • NEW YORK 12, N.Y.

use with induction, gas-air, furnace, or any of the commonly used heating methods. The same accurate metering of alloy, leak tightness and standardized costs are obtainable with these as with blanked washers.

The new washers are wound in a

variety of sizes and alloys. Diameters up to 4" i.d. are held to close tolerances in thicknesses from .010 upward. Available in Easy Flo and Silfos as well as copper, bronze and the more commonly used alloys.

Use ACTION Card, opposite page 64. Encircle No. 17

Facing, boring heads have self-acting power feeds, automatic end release

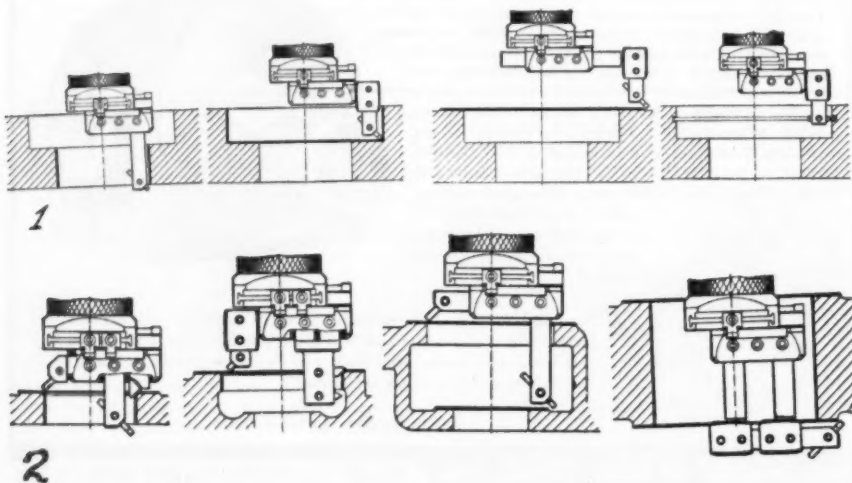
Wohlhaupter universal facing and boring heads distributed by Karl A. Neise, Dept. B, 381 Fourth Ave., New York 16, N.Y., feature self-acting power feeds and automatic end release. They are applicable to boring mills, jig borers, radial drilling machines, lathe millers and other machine tools as well as to production units, and can be used for boring, facing, recessing, undercutting, taper and form turning and in part also for threading stationary work, without reclamping.

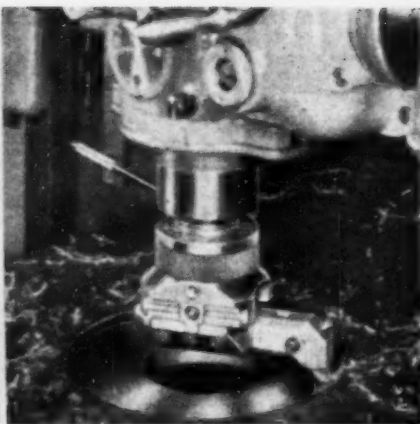
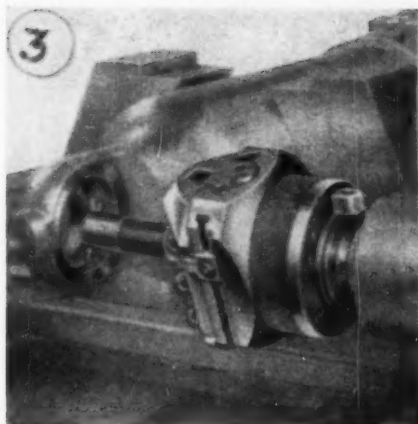
All parts are hardened and ground and the sliding parts are lapped. Shank and body are of one piece. Self-acting slide feeds with automatic end release and their settings are said to allow close limits of accuracy, a smooth surface finish and straight faces. Bulky, hard-to-clamp work can be safely machined, also.

By using the cross feed in conjunction with the axial feed of the machine spindle or table, tapers may be produced. The

The drawings show figure 1, left to right: Boring by means of a long boring bar; boring and facing by means of a boring bar holder and a boring bar; facing a large diameter by means of a long boring bar holder and a boring bar; recessing by means of a short boring bar holder and a boring bar.

In figure 2, left to right (first 2 drawings): Boring, facing and turning by means of special type tool holders and two stops (batch production); facing two hubs by means of two boring bars (batch production); facing rear portion by means of two boring bar holders and one boring bar.





Shown in the two photos, figure 3, are (left): Performing boring, facing undercutting and threading operations on a horizontal boring and milling machine; (right) facing and boring a large fixture by means of a tool holder on a vertical jig boring machine.

slides move in both directions to the extent of half their adjustment beyond the central axis of the head.

These heads are supplied in various sizes and may also be supplied, upon request, with special type shanks.

Use ACTION Card, opposite page 64. Encircle No. 18

DRILL PERPENDICULAR HOLES and REAM TO ANY ANGLE Without GUIDANCE!

Guide-A-Drill

Not A Spirit Level

\$6⁹⁵
each

Fits All Drills

**ORDER
TODAY**



Eliminate costly templates, broken drills and reamers! Guide-A-Drill makes your most inexperienced operator an expert at drilling a straight hole from any angle! Pays for itself in one operation.

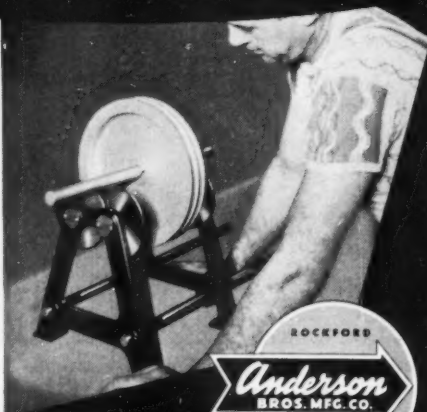
THE ROY SILVER CORP.
561 Bridgeport Ave., Devon, Conn.

PRECISION BALANCING WAYS

Save Time . . . Cut Cost

Balance rotating parts easier, faster, more accurately with supersensitive Anderson Balancing Ways. No setup, no leveling, no centering. Chilled iron discs, ground and balanced to extreme accuracy, rotate with minimum friction on special bearings. Glass-hard spindles and bearings prevent wear or ball-bearing indentations when balancing heavy weights. Superior accuracy lasts throughout long life. Proved and preferred 38 years. Write for bulletin 6-5.

Swing	Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000



ANDERSON BROS. MFG. CO., ROCKFORD, ILLINOIS

Combination Grinder EC



WARDWELL

MANUFACTURING CO.

3807 Ridge Rd., Cleveland 9, Ohio

Makers of largest line of saw and tool sharpening machines

PAYS for ITSELF

**by sharpening just one
gross of hack saw blades**

Recondition your Band, Circular and Hack Saws in a Wardwell EC Combination Grinder and make them actually *better than new.*

The EC Grinder creates a natural cutting edge, because new blades usually are ground before hardening. The only grinder that does not depend upon the shape of the grinding wheel to form the shape of the teeth—enables you to grind a variety of blades without dressing or changing wheel.

Write for Bulletin describing
the remarkable EC Grinder

New Crowningshield vertical miller

Said to be a practical miller for both production and tool room milling, built for flexibility, ample range, and versatility; available with a Bridgeport Model "M" milling and drilling attachment and adapters as well as the Crowningshield milling unit or without any head for



those having a spare that will fit this miller; can be fitted with air feed to the table if desired.

Some specifications include: table size $8\frac{1}{8}'' \times 28''$; table travel (long.) $16\frac{3}{4}''$; vertical feed with Bridgeport head $13\frac{1}{2}''$; vertical feed with Crowningshield head $15''$; cross feed $6''$; max. dist. spindle to table—Bridgeport $13\frac{1}{2}''$; Crowningshield $15''$; spindle speeds—Bridgeport 275-4250, Crowningshield 330-2900; $\frac{1}{2}$ hp—3 hp motors with reversing switch used; weight with vertical head approx. 800 lbs. Crowningshield-Harris Co., Dept. B, Greenfield, Mass.

Use ACTION Card, opposite page 64. Encircle No. 19

Live bushings on boring mill piloting applications utilize carbide tools to full capacity

A new line of Jergens roller bearing live bushings for piloting applications on various sizes and makes of boring mills is announced by the J. G. Jergens Co., Dept. B, 11106 Avon Ave., Cleveland, Ohio.

According to the manufacturer these live bushings replace the bronze bearings in the column supports of boring mills

DEPENDABLE ACCURACY



INSPECTION TOOLS made of MEEHANITE METAL are designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.

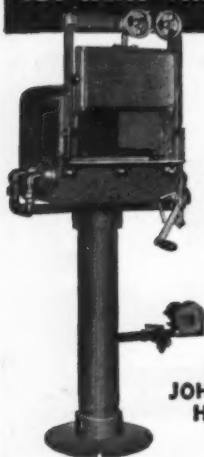
Surface Plates — Box Parallels
Slotted Angle Plates
Universal Right Angles
Flat Parallels — Lapping Plates
Toolmaker's Knees — "V" Blocks
Straight Edges (Bridge Type)
Straight Edges (Leveling Type)
Measuring Irons
Masterangle Plates
Angle Attachments

Send for Bulletin

ACME TOOL COMPANY

71 W. Broadway, New York 7, N. Y.

SAVE HOURS CUT HEAT TREATING COSTS



**Quick Acting
JOHNSON No. 130A
Hi-Speed Furnace**

Save time, save gas...heat treat carbon and high speed steels, dies and tools with JOHNSON 130A. Powerful burners provide fast uniform heat with time saving speed. Gets the job done while other furnaces are still warming up. Two sizes offer wide temperature range for any steels. Temperatures easily regulated with accuracy. Counterbalanced door opens upwards. Firebox 7"x13"x16½" lined with high temperature refractory. Complete with Carbofrax Hearth, G. E. Motor and Johnson Blower.

For temperature range
1400° to 2350°F\$325.00

For temperature range
1800° to 2400°F\$355.00

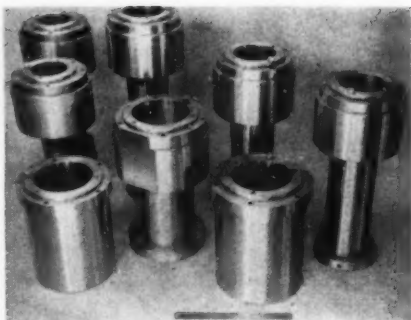
F.O.B. Factory

Models available in smaller firebox sizes. Write for Free Catalog.

JOHNSON GAS APPLIANCE CO.
570 E Ave. N.W., Cedar Rapids, Iowa

Since
1901

JOHNSON
FURNACES FOR INDUSTRY



giving greater rigidity with corresponding increases in precision and length of tool life, permitting the use of carbide tools to their full capacity for heavier cuts at higher speeds.

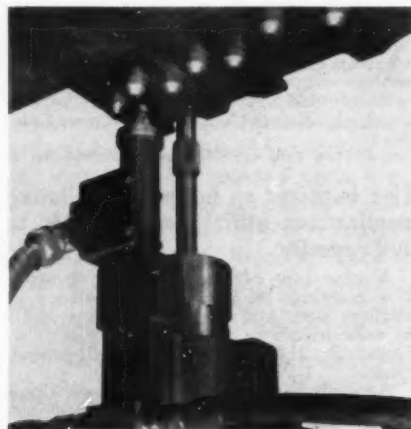
Liners of these bushings rotate with the bars preventing scoring and wearing of expensive boring bars.

Use ACTION Card, opposite page 64. Encircle No. 20

Automatic selector for Roll Shop

A new automatic feature has been added to the "American" hydraulic roll duplicating lathe. It is an electrical device working off the template which automatically selects the correct operating cylinder and instantly makes the change from one cylinder to the other at the proper time, thus relieving the operator of this manual operation.

Contacting buttons are located at pre-



determined points on the template; when the contactor touches one of these buttons the automatic selector mechanism, located in the control box attached to the right-hand hydraulic cylinder, is energized and the change from one cylinder to the other instantly occurs. The American Tool Works Co., Pearl St. at Eggleston Ave., Cincinnati 2, Ohio.

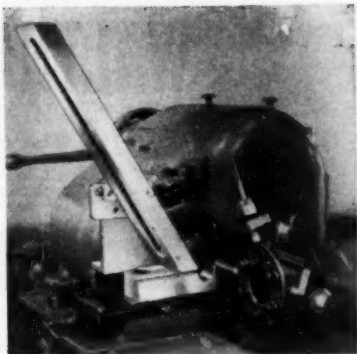
Use ACTION Card, opposite page 64, Encircle No. 21

Magazine attachment for B. & S. machines

The Alco Tool Company has just announced a magazine attachment for B & S automatic screw machines which permits second operations to be performed semi-automatically.

The Alco magazine consists of a complete setup, including the magazine for holding and carrying work to the chuck, cams, form tools, and a chuck complete with ejector and inserting tool.

No extra drilling or fitting is necessary when attaching the magazine. It is mounted on the front cross slide of the machine and is ready for immediate operation. One operator can handle additional automatics while keeping the chute

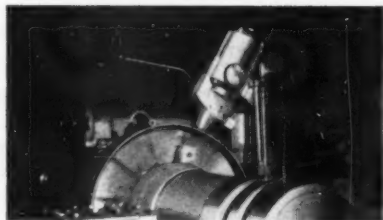


in the magazine filled; a definite saving in man hours. Parts can be automatically ejected and dropped into the work pan.

Odd shaped parts and parts which heretofore have been difficult to magazine are being handled successfully with this attachment, according to The Alco Tool Co., 152 Birdseye St., Dept. MB, Bridgeport 4, Conn.

Use ACTION Card, opposite page 64, Encircle No. 22

INCREASE PRODUCTION...



Above is shown a 6M Fen Automatic Wrench operating a 28" heavy duty chuck.

ELIMINATE "WRENCH WRESTLING"

You can put the advantages of the Fen Automatic Wrenches to your work right in your own shop on machines already in operation, or specify them on your new standard or automatic machines.

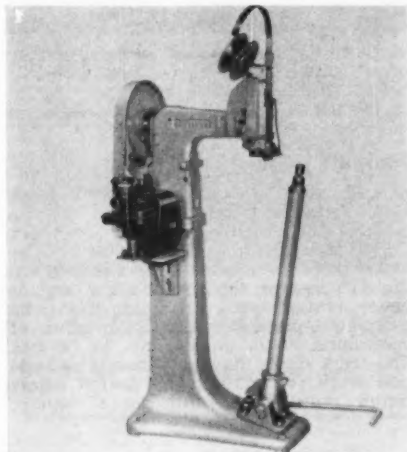
For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

**THE FEN
MACHINE COMPANY**
28914 Lakeland Blvd.
Wickliffe, Ohio

Gas-driven stitchers

Bostitch, which produces a line of 67 wire stitcher models, has announced a new gasoline-operated motor drive which is available on its No. 14 and No. 14B box and bottom stitchers.

With this new power unit it is said to now be possible to utilize wire stitching



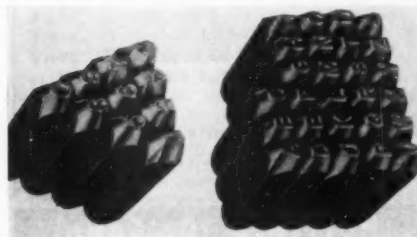
in locations where electric power is not available and to change the location of the stitcher frequently. Bostitch, 1013 Mechanic Street, Westerly, R.I.

Use ACTION Card, opposite page 64. Encircle No. 23

Stamps developed for marking forging dies

New series of flat-faced letter and figure stamps for marking forging dies introduced by M. E. Cunningham Co. Dies marked with Style FR stamps produce finished forgings with raised characters.

Sides of the characters are a rounded



THE costliest cutting tool IN YOUR PLANT

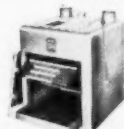


CYCLONE TYPE



No—it's not a tool of production—it's a tool of destruction! . . . it is ABRASIVE GRIT—by-product of your grinding, cutting and finishing operations.

Hammond
DUSKOLECTORS



FILTER TYPE

Protect employees' health
Protect nearby materials and machine tools
Reduce cleaning costs
Provide cleaner working conditions

Eliminate the dust menace.
Write for catalog today.

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1614 DOUGLAS AVE. KALAMAZOO, MICH.



TOOLMAKER'S DRILL CHUCK

Will locate your layout

to .0001"—200% saving

in time. For vert.

mills, radial drills and

lathes. Combination of

high precision chuck

and totally enclosed

optical unit. Adjust-

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out. Priced consider-

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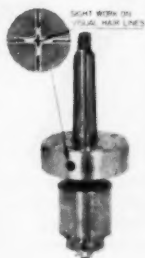
might expect to pay for

this unique tool. No. 2 or No. 3 Morse

taper 0" to 1/2" or 1/8" - 5/8" capacity.

Write today for literature

Several territories open for distribution.



BANSBACH MACHINERY CO.

221 N. CICERO AVE. CHICAGO 44, ILL.

45° bevel; metal does not lock in the markings.

Made of Mecco safety steel; do not mushroom or spall in service; available in a full size range from 1/16" to 1/2". Other sizes can be made to order for certain operations. M. E. Cunningham Co., 1043 Chateau Street, Pittsburgh 33, Pa.

Use ACTION Card, opposite page 64. Encircle No. 24

Beautifies, protects floors

Flexrock Bakeflex is said to preserve the surface and save the floor. Arrests "dusting" of concrete before it progresses to the "hole and rut" condition that requires repair. New or comparatively new concrete is kept smooth, non-sanding and easy to clean.

There are two formulations of Bakeflex, the regular and Bakeflex AWA. Bakeflex regular is a blend of synthetic resins in oil and is recommended for wood floors as a seal and finish. Bakeflex AWA is a non-saponifying acid, water, alkali, and grease resistant finish. It is used as a protective coating on all types of floors where liquids are present; withstand heavy industrial traffic, gives a rich appearance. Available in tile red,



battleship gray, emerald green, linoleum brown plus clear. Flexrock Co., 3634 Filbert St., Philadelphia 1, Pa.

Use ACTION Card, opposite page 64. Encircle No. 25

Tool, die table

Setup time savings are possible with a new advance rotary type tool and die table, it is claimed by Advance Products, Dept. MB, Benton Harbor, Mich. The work piece is located and clamped on the 11" square top cross slide, and is never moved until all work has been completed—regardless of the number of operations, radii, angles, etc. to be cut. The cross slides may be adjusted to position work for cutting any radius whose center point lies within an 8" square

WALTON TOOLS

TIME AND LABOR SAVERS FOR
MACHINE SHOPS AND INDUSTRY



WALTON TAP EXTRACTORS

Cut costs of
Removing
Broken
Taps

Universally used for removing stubborn, balky taps that break off deep in threaded work. Quick, easy, inexpensive. Will not damage threads. In 2, 3 and 4 flute styles—sizes No. 4 to 1 1/2".

WALTON-AMERICAN TOOL HOLDERS

Save Time and Labor
on Tool Changes.



Many holders in one. Head will swivel around an entire circle. May be set for straight, right or left hand offset positions. Will hold with perfect grip any size square or round tool bit or boring bar from 1/8" to 7/16".

"*REPS" PIPE & STUD EXTRACTORS

Reduce Labor Costs
For Removing Pipes,
Studs and Screws.

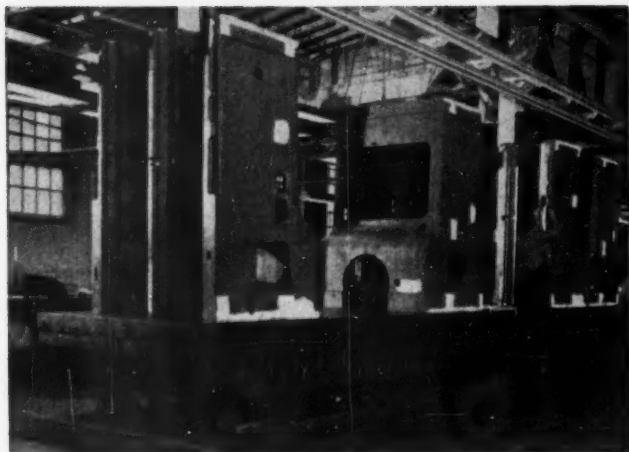


For removing broken pipes or studs that defy movement. "Reps" makes a strong four point grip without hammering or pounding. Hardened steel. Pulls rather than reams. In sizes, for every pipe from 1/8" to 2", every stud and screw from 3/8" to 3 1/2".

(*Reps. Tool Company, Inc., a Walton affiliate.)

Sold by leading dealers, or write direct for catalog No. 12 of Walton Tools and details of 30 day free trial offer.

THE WALTON COMPANY, Hartford 10, Conn.



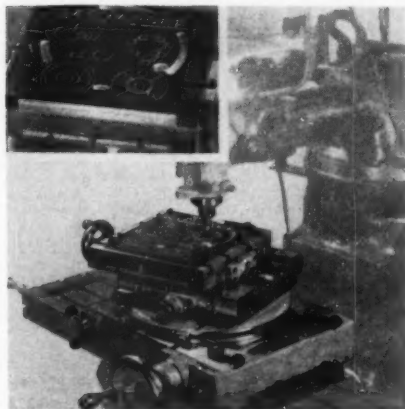
LARGE HEAVY DUTY SURFACE PLATES

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ILLUSTRATED
CATALOG
UPON REQUEST

GOODMAN MANUFACTURING COMPANY

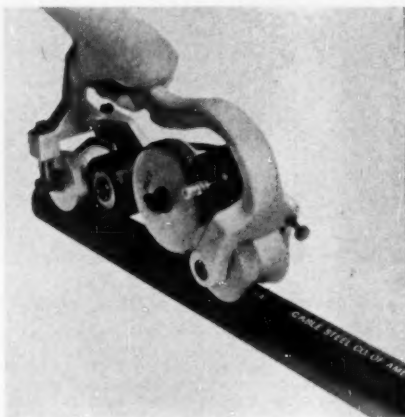
4834 So. Halsted Street

Chicago 9, Illinois



Matthews portable bar and tube printer

The new No. 230 Matthews portable printer, developed and manufactured by Jas. H. Matthews & Co., 3946 Forbes St., Pittsburgh, Pa., for continuous printing of trade names, codes, inspection marks,



area centered on the table, (all from one setup), and keep all dimension points in exact relationship to each other. Stops are provided so standard gage blocks can be used for extremely precise work.

Use ACTION Card, opposite page 64. Encircle No. 20

etc., on flat, round, square or hexagonal surfaces.

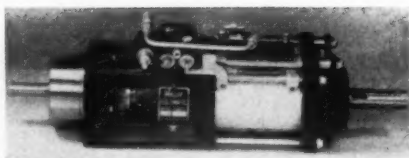
Riding on front and rear positioning rolls, the printer will automatically adjust itself to the size and shape of the material to be marked. As the printer is manually rolled along the stock on the positioning rolls, the rubber-covered drive roll, mounted directly behind the front positioning roll, is actuated by contact with the stock; thereby transferring power to the rotating printing roll, which gains the proper amount of ink from the ink fountain, and then rolls on the impressions. Since the copy moves at the same rate of speed as the printer, clear, unsmudged impressions are obtained. Unit weighs approx. 8 lbs.

An ink supply capable of imprinting thousands of impressions is inserted into the reservoir of the ink fountain which is fed by capillary action.

Use ACTION Card, opposite page 64. Encircle No. 27

Hause Engineering adds new drill unit to Holomatic line

The Model 04 air-hydraulic drill unit has a pulley drive spindle; weighs 44 pounds; capable of production drilling operations up to $\frac{3}{4}$ " in mild steel, according to Hause Eng. Co., Dept. MB,



Montpelier, Ohio.

Stroke is adjustable to a full 4 inches. Can be set up for either automatic or manual cycling. Positive stop with dwell or instantaneous retract operation, continuous cycling, skip drilling, back feeding and manual jogging.

Use ACTION Card, opposite page 64. Encircle No. 28

1½ ton midget press

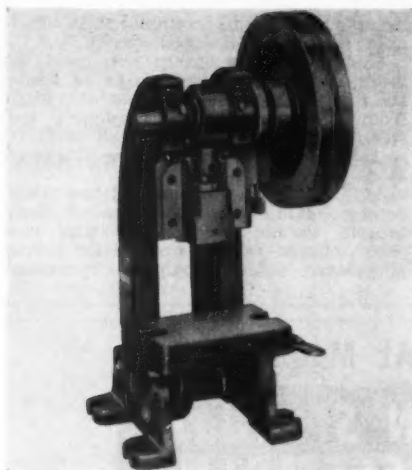
A precision-built O.B.I. midget punch press, following the general lines and rigid specifications of the 4 and 5-ton Kenco presses is announced. They feature: Solid crankshaft of alloyed steel, heat-treated and precision-ground; roller bearing-mounted flywheel; clutching mechanism self-contained and independent of the crankshaft; drive collar made of alloyed steel, heat-treated and ground; connecting rod and crankshaft bearings of



Engineered Live Centers

... A properly designed Live Center is one of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.

STURDIMATIC
TOOL COMPANY
3802 F STREET • DETROIT 18, MICH



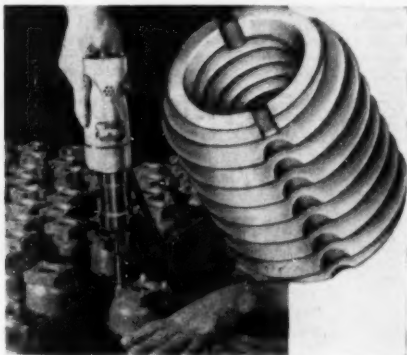
special alloyed bronze; ram and ram guides 90° V-type with oversized length; frame of special alloyed casting structure, pre-heat-treated, tested and precision-machined. Kenco Mfg. Co., 5211½ Telegraph Road, Los Angeles 22, Calif.

Use ACTION Card, opposite page 64. Encircle No. 29

Threaded insert designed for screwdriver installation

An improved WEG insert, now slotted for fast screwdriver installation, is announced by Roylyn, Inc., Dept. MB, 1706 Standard Ave., Glendale, Calif.

The insert provides a permanent thread anchor for bolting metal to metal, wood and plastic. Of one part, it locks in position with pins. Slotted for screwdriver



For Unvarying ACCURACY...

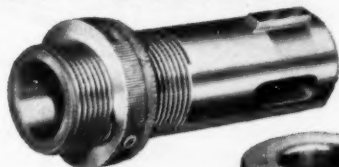
Standardize on ECONOMY

"TRU-LOC"

**Adjustable Adapters
& Nut**

- ✓ CONCENTRIC
- ✓ GROUND ACME THREADED BODY
- ✓ "TRU-LOC" NUT — Lock in Any Position
- ✓ WOODRUFF KEYWAY — Relieved

All items in stock — immediate delivery assured. Write for latest Bulletin and Price List.



Economy

"TRU-LOC" Adapter

Sleeves

A.S.A. Drill Jig Bushings

A.G.D. Plug & Ring

Gages



Economy

TOOL & MACHINE CO.

1824 S. 68th St.

• Milwaukee 14, Wis.

installation, in sizes up to and including $\frac{1}{4}$ ". Larger sizes installed with simple insert driver.

Use ACTION Card, opposite page 64. Encircle No. 30

Perforators available in wide range of sizes

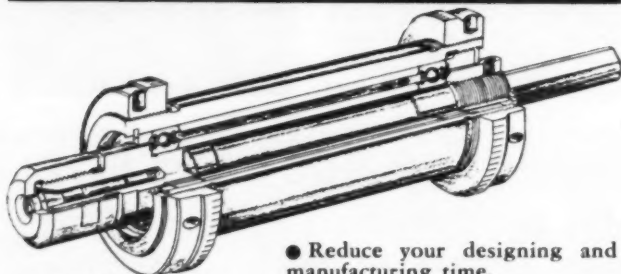
American standard perforators are available in a wide range to suit hole diameters and spacing variations. The standard group of punches, for use in medium and average service stamping work, comes in all twist drill series,

number, letter, and fractional sizes, available from semi-finished stocks.

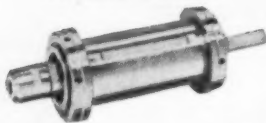
The heavy duty group will meet the more rugged requirements of heavy stamping work. All punches are made from non-deforming oil hardening tool steel, heat-treated to Rockwell 60-61 (C scale) with heads redrawn to Rockwell 45-48 to resist fracture.

All are precision ground on dead centers. Bodies have "press-in" lead, ground to standard reamer size, plus .0000", minus .0003" to provide for proper alignment before applying "press-in"

Complete Your SPECIAL Machines Faster with GILMAN Standard SPINDLE ASSEMBLIES



COLLET TYPE



MORSE TAPER TYPE



● Reduce your designing and manufacturing time.

● Some types available from stock—others in not over 90 days.

● Hold drills, reamers, taps, end mills and other small tools. Sizes to fit No. 0 or No. 1 Morse taper shanks, or $\frac{1}{8}$ ", $\frac{3}{16}$ " or $\frac{1}{4}$ " max. capacity collets.

● Longitudinal spindle adjustment in increments of 0.0005".

● Single row ball bearings at each end are standard. Double row also available.

Write Now for FREE Literature

RUSSELL T. GILMAN, Inc.

2412 N. FARWELL AVE. • MILWAUKEE 11, WIS.

load. Diametrical tolerance of tips and bodies is plus .0003", and minus .0000. Write American Standard Perforators, Dept. BB, 4878 W. Grand Ave., Chicago 39, Ill.

Use ACTION Card, opposite page 64. Encircle No. 31

V-Belt with 40% more hp capacity

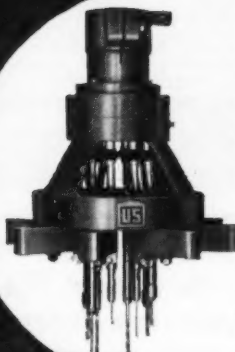
Raybestos-Manhattan, Inc., Manhattan Rubber Div., 61 Willet St., Passaic, N.J., has introduced an improved "super-power" V-belt which, the company says, has a horsepower capacity average of 40% over standard V-belts.

The company states that in addition to providing 40% greater horsepower capacity on existing drives, the belt, known as the R/M Super-Power V-belt, lasts relatively longer than standard V-belts. On new drives, narrower sheaves may be used; has practically no stretch.

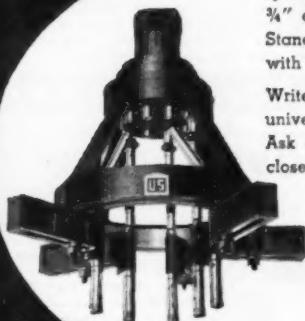
Its design incorporates a new super-strength synthetic fiber strength member for greater power. The new belt's construction is of all synthetic rubber, and is also oil-proof, non-spark and heat-resistant.

Use ACTION Card, opposite page 64. Encircle No. 32

KEEPING UP WITH THE JONESES



U-1



U-2

The "Joneses" and the companies they own save money, time and effort by relying on "US" Adjustable Multiple Spindle Drill Heads with QUICK-CHANGE universal joint assemblies.

We give the "Joneses" and you —immediate delivery

The U-1 Head—two to eight spindles—can be adjusted to a minimum distance between spindles of 11/16" anywhere in an area of a 6" diameter circle.

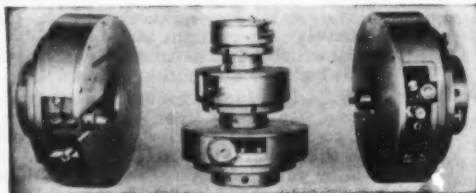
The U-2 Head has two to twelve spindles, each built to drill up to 3/4" diameter hole in cast iron. Standard spindles are furnished with No. 1 or 2 Morse Taper.

Write for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear driven adjustable, fixed center, or individual lead screw tapping heads.



UNITED STATES DRILL HEAD CO.

616-618 Burns St., Cincinnati 4, Ohio



MUMMERT-DIXON FACING HEADS with Automatic Feed

One-way Tool Feed — 6, 9 and 12" sizes.

Two-way Tool Feed — 9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.



MILWAUKEE SURFACE PLATES THE KEYNOTE TO ACCURATE MEASUREMENT

Over twenty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates. Angles, Parallels and Straight Edges are all made of the highest quality semi-steel and finished to exact dimensions.

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J. C. BUSCH COMPANY

Engineers and Machinists Since 1907

165 S. BARCLAY ST. • MILWAUKEE 4, WIS.



*You Need an Extra Hand Now
to Speed Up Production!*

HEIMANN TRANSFER SCREW SETS

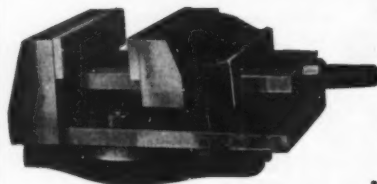
Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.



HEIMANN MFG. CO. • URBANA, OHIO

PLUNKET IMPROVED VISES



We make a complete line of modern vises for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked.

In ordering this vise give size of slot in table:

No. 10—6" jaws, 1 1/2" deep, opens 5"

wt. 45 lbs. \$ 81.84

No. 20—10" jaws, 2 1/4" deep, opens 8 1/2"

wt. 120 lbs. \$118.88

Best material and workmanship. Prices are net f. o. b. Chicago. Dealers' inquiries are solicited.

Write for folder TODAY.

J. E. Plunket Machine Co. 3238-32 Archer Ave.
Chicago 8, Ill.

Shock resistant gasket mounted valve

A new gasket mounted, solenoid operated, 4-way valve, claimed fully shock resistant, has been developed by Rivett Lathe & Grinder, Inc., Dept. B, 18 River-view Road, Brighton 35, Boston, Mass. Impact and shock eliminated by use on valve spool of a scalloped design, which opens or closes gradually increasing or decreasing areas to the ports as the spool is moved left or right.

Metering grooves built into the spool, plus a choke block assembly to control

speed of the spool, aid in allowing flow to enter and leave the valve with an easier, smoother action, permit use of the valve as a de-compression valve and a 4-way valve in one.

Designed for 3000 psi oil hydraulic service, meets all J.I.C. requirements. Two basic valves can be used for five sizes; by merely changing pipe tap size the 1" valve may be used for $\frac{1}{2}$ ", $\frac{3}{4}$ " or 1" ips., and the $1\frac{1}{2}$ " valve for $1\frac{1}{4}$ " and $1\frac{1}{2}$ ".

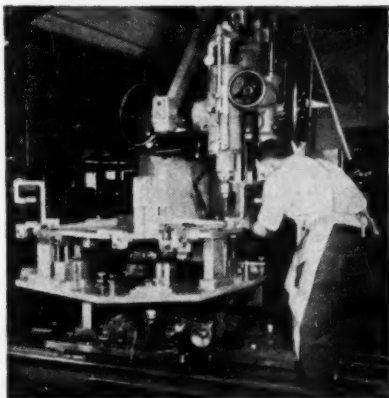
Use ACTION Card, opposite page 64. Encircle No. 33

TOUGH PROJECTS OR PRECISION PRODUCTION CALLS FOR CONTRACT JIG BORING BY

B. Jahn

**BATTERIES OF THE LATEST JIG BORERS
MANNED BY MASTER TOOLMAKERS
MAINTAIN YOUR SPECIFICATIONS ...
SCHEDULES ... SATISFACTION!**

B. Jahn engineering superiority is continuously overcoming seemingly insurmountable jig boring obstacles. Whether it be a single fixture or a production run — a simple task or a real production headache — investigate B. Jahn contract jig boring and the dividends of time saved, money saved it can pay you.



◀ In the large B. Jahn plant, 16 modern jig borers — in every size — are at the service of industry.

▲ Jig boring a huge radar housing fixture. Over 200 individual holes were held to ten-thousandths tolerances.

FACILITY LIST AND LITERATURE SENT ON REQUEST. QUOTATIONS HANDLED PROMPTLY.

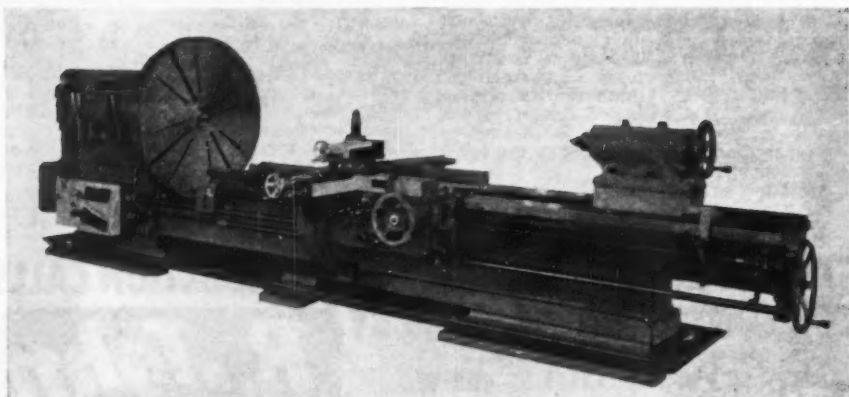
DESIGN AND CONSTRUCTION OF DIES • TOOLS • JIGS • FIXTURES • GAGES • SPECIAL MACHINERY • JIG GRINDING • JIG BORING • KELLER DUPLICATION



B. Jahn

B. JAHN MANUFACTURING COMPANY NEW BRITAIN, CONNECTICUT

Redesign Nebel bed gap lathe



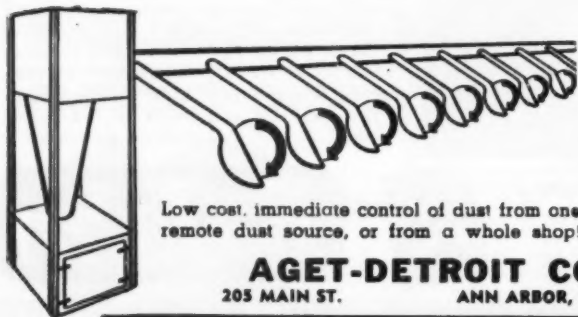
The redesigned 28"/50" 'G' series extension bed gap lathe just announced by the Nebel Machine Tool Co., Dept. B, Cincinnati 25, Ohio, has more capacity and power and is heavier than the previous design. It swings 52" through the

gap and is arranged for a 25 hp main drive motor. The upper and lower beds are now made 75% heavier.

This type of lathe is suitable for turning big, clumsy, hard-to-handle work. In many cases it saves disassembling and re-

STOP DUST

with **DUSTKOP**



Low cost, immediate control of dust from one remote dust source, or from a whole shop!

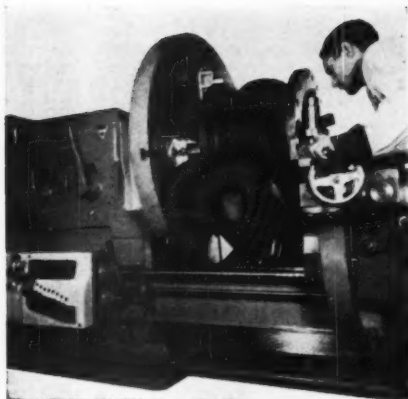
300 cfm to 10,000 cfm
per unit (22 models)
standard, pre-tested,
available from stock.
Ask for catalog 605-2.

No obligation.

AGET-DETROIT CO.

205 MAIN ST.

ANN ARBOR, MICH.



assembling parts like the huge valve shown in photo.

The Nebel 'G' series lathe has these additional refinements, according to the manufacturer: 1. Shaved and hardened headstock gears throughout the headstock; 2. drive gears in headstock now cut helical; 3. hardened gears throughout apron and quick change box; 4. a "v" has

been added to the rear of the lower bed to achieve perfect alignment and to facilitate movement of the upper bed; 5. tailstock is heavier and larger, having a $4\frac{1}{4}$ " diameter spindle and $10\frac{1}{2}$ " of spindle traverse.

Nebel officials announce also that new attachments and accessories are available for use on the redesigned Nebel 'G' series extension bed gap lathe including power rapid traverse, dynamic braking motor, replaceable hardened steel carriage way inserts, hydraulic duplicating attachment and others.

Use ACTION Card, opposite page 64. Encircle No. 34

Leak tester for castings

Moore Products Co., Dept. MB, Philadelphia 24, Pa., announces the development of a standard cabinet unit for leak testing of castings and assemblies at production line speeds.

This equipment uses a pneumatic system which operates on the plant air supply and eliminates "dunking," with the usual need for drying and rust prevention.

The Moore leak testing system operates: First, to pressurize the cavity of the workpiece; and then, to measure and

OVER 1500 NOW IN USE!

ABA Precision Surface Grinder

WITH HYDRAULIC TABLE FEED
AND ADDITIONAL HAND FEED

Where highest precision is required the ABA Precision Surface Grinder meets every test. With the aid of divided heads, sine plates, and other attachments it can handle the heaviest and most difficult jobs. Complete hydraulic table feed as well as manual operation make this grinder doubly practical. The use of ball bearings means extremely easy handling of all hand wheels and operating levers.

STOCK DELIVERY!

PARTIAL SPECIFICATIONS	Max. length of grinding area	24"
	Max. width of grinding area	8"
	Long. table speed, infinitely variable FPM	55'
	Grinding wheel	8"x14"

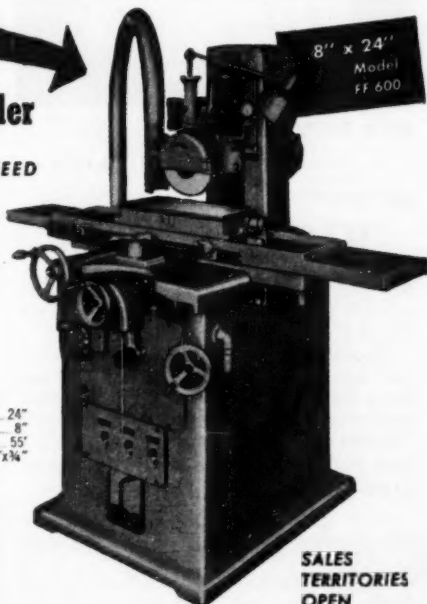
For full specifications write to Dept. B-2.

MOREY MACHINERY CO., INC.

Manufacturers • Merchants • Distributors

383 LAFAYETTE ST. • NEW YORK 3, N. Y.

ALBANY 4-5600 • CABLE ADDRESS: WOODWORK, N. Y.



SALES
TERRITORIES
OPEN

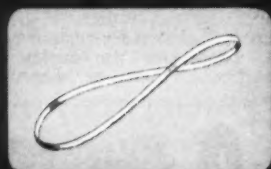
3 ways to cut Metal



HAND



POWER



BANDSAWS

one way to get
the right Blade —

call your

VICTOR distributor

For over 50 years, industry has preferred Victor Hand, Power, and Metal and Wood Cutting Bandsaws.

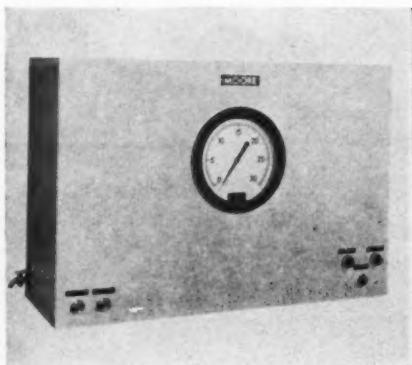
The Victor Distributor is the place to call not only for Victor Metal Cutting Saws but also for the hundreds of other products you need regularly to keep production up and costs down.

Sold Only Through Recognized Distributors



SAW WORKS, INC. • MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saws.



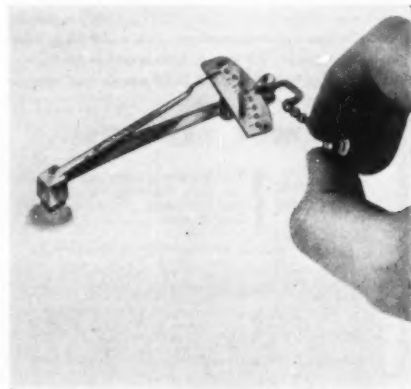
to amplify the difference between the original fill pressure and its lowered value, if a leak in the wall of the work-piece is present. The amount of pressure change within an established test time becomes a direct measurement of the magnitude of the leak. Since the system measures and amplifies pressure-difference (and not the fill-pressure drop-off alone) comparatively small leakage results in wide motion of the gauge pointer in a short test time.

Use ACTION Card, opposite page 64. Encircle No. 35

Inch-Gram torque wrench

The P. A. Sturtevant Co., Lake St., Addison, Ill., introduces a new standard model torque wrench, the F80-I-G, 0" to 80" gram range, believed to be the lowest capacity instrument of this type ever offered.

Widely spaced increment markings on the scale are in steps of 5 inch-grams,



MACHINE and TOOL BLUE BOOK

and are easily read by an operator from any working position. Other models are available in the same style in ranges from 0 to 8 inch-ounces and 0 to 16 inch-ounces.

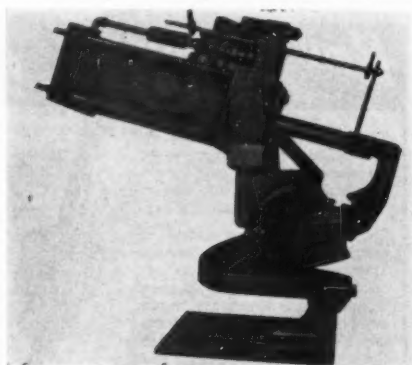
These are designed for use in the electronics, instrument and precision equipment field and are suited for applications requiring special torque testing fixtures.

Use ACTION Card, opposite page 64. Encircle No. 36

Pneumatic throatless shear

A pneumatically operated high production throatless shear which operates on shop air pressure (60-100 psi) recently introduced by the Beverly Shear Mfg. Co., Dept. MB, 3009 W. 111th Street, Chicago, Ill., makes any cut, straight, curved or irregular, and has a capacity of 3/16" in mild steel and 10 gage in stainless.

Air operation of the shear permits fast, accurate and effortless cutting of any shape in metal to the capacity of the shear. A double acting trunnion mounted cylinder has its piston rod direct-connected to the upper blade actuation arm for straight line power strokes and greatest operating efficiency. Length and speed of the shear's stroke may be adjusted by positioning the movable switch



contact arms. The power stroke and power return are controlled by a solenoid operated 4-way valve.

Use ACTION Card, opposite page 64. Encircle No. 37

Improve Nelco tools

Nelco carbide tools are said to now have new, longer life alloy bodies; all Nelco shell mills, 6" and 8" face mills and No. 50 NMTB taper shank end mills incorporate structural improvements.

For quick, positive identification and

PRESSURE HANDLE



DRILL... QUICKLY— SAFELY-EFFICIENTLY

By adapting a Pressure Handle to your presently laborious drilling jobs, one man with a Pressure Handle can control drilling operations to a maximum, thereby, reducing labor costs, twist drill breakage and operator fatigue. By having complete control of the drilling at all times, accidents are at a minimum.

Can you drill a 2" hole in 3" stainless steel pipe in 20 seconds? You can if you are using a Pressure Handle.

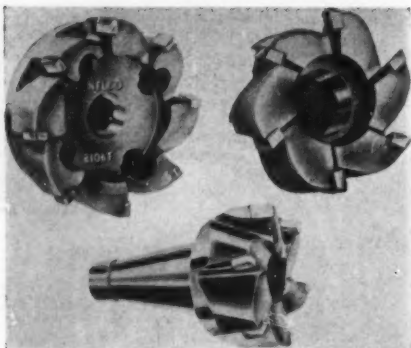
A PARTIAL LIST OF SATISFIED PRESSURE HANDLE CUSTOMERS

Ford Motor Car Co.	Kendall Refining Co.
Chrysler Corporation	Cities Service Oil Co.
Cadillac Motor Corp.	Pennsylvania State Hwy.
Timken Roller Bear. Co.	Baldwin Locomotive Wks.
Dupont	Glen Alden Coal Co.
Fruehauf Trailer	Briggs Body Corp.
Bethlehem Steel	Worthington Pump Co.
Otis Elevator Co.	Carrier Corp.
Congoleum-Nair Co.	Aluminum Co. of America
Philadelphia Navy Yard	Revere Copper & Brass
General Electric Co.	St. Regis Paper Co.
American Radiator	International Harvester Co.
Armstrong Cork	Endicott-Johnson Corp.
Jones & Laughlin Steel Co.	and many more . . .

Territories open for ambitious specialty salesmen.

PRESSURE HANDLE COMPANY

North State Street Wilkes-Barre, Pa.



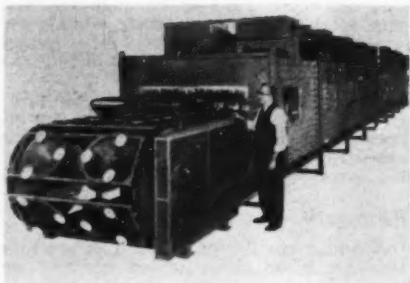
certain rust prevention, these advanced alloy bodies are copper or cadmium plated. The Nelco Tool Co., Pine St., Manchester, Conn.

Use ACTION Card, opposite page 64. Encircle No. 38

Bake oven for cathode ray tubes

Steiner-Ives announces a new electric conveyor screen bake oven with a built-in purging system to handle aluminized cathode ray tubes.

The oven is constructed so as to permit the addition of an air purge system for



processing aluminized tubes with temperatures regulated so that the purging air that is blown into the tube is the same temperature as the corresponding air in that section of the oven.

Heating system is of the recirculated air type with heating sections individually controlled.

The conveyor speed is variable having as its mean a speed of approximately 14" per minute; approximately 63 tubes per hour.

The conveyor flights are designed to carry 21", 24", 27" and possibly 30" tubes two abreast. For application to smaller

CUT QUOTES

UP TO 30%
ON PRODUCTION TURNING
AND GRINDING OPERATIONS

**FOR
HIGHER
PRODUCTION**

- Eliminates Driving Dog
- Whole length of workpiece can be machined in one pass
- Machine need not be stopped between workpieces
- Workpiece end need not be square or flat



**Our New
DRIVING CENTER**
(Pat. Applied for)

is revolutionizing any work done between centers by replacing the driving dog with a driver on the end of the workpiece. Thus, the hazard, fatigue, whip, bow, and vibration caused by driving dogs are eliminated, and the work quality is greatly raised.

Write



ZEE-HAWK[®]
MACHINE SPECIALTIES, INC.
3716 20th W. MONTROSE AVE.
CHICAGO 18, ILLINOIS

Available from stock in Morse Tapers 2 to 6 for 9/16" diam. and up.

How TO SHORTEN SET-UP TIME!

The time required to set up a machine for a tapping or reaming job is reduced considerably if you use a Ziegler Floating Tool Holder.

This is because, with a Ziegler Holder, the set-up does not have to be so accurate. Even if the spindle is out of alignment as much as 1/32", the Ziegler Floating Holder compensates for the inaccuracy, enabling the machine to perform perfect work.

W. M. ZIEGLER TOOL COMPANY
13570 Auburn, Detroit 23, Mich.



WRITE FOR CATALOG



FLOATING HOLDER
for Taps and Reamers...

tubes the set-up may be converted. The smaller tubes may then be placed in rows of three abreast.

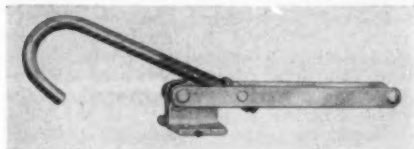
Each of nine sections measures 9'6" long; inside oven dimensions are 51" high and 84½" wide. The total oven length is 85' 6". The total overall length of the entire unit is 105 ft. The necessary operating power is from 330 kilowatts to 480 kilowatts, for temperatures of up to 400° Centigrade. Steiner-Ives Co., 387 Springfield Rd., Union, N.J.

Use ACTION Card, opposite page 64. Encircle No. 39

Two new Lapeer clamps

A midget sized clamp is announced by its manufacturer, Lapeer Mfg. Co., 3052 Davison Rd., Detroit 2, Mich. Though small in size, it is said to be strong. Two new types are offered, both similar in design and performance to their larger counterpart models in the Knu-Vise line.

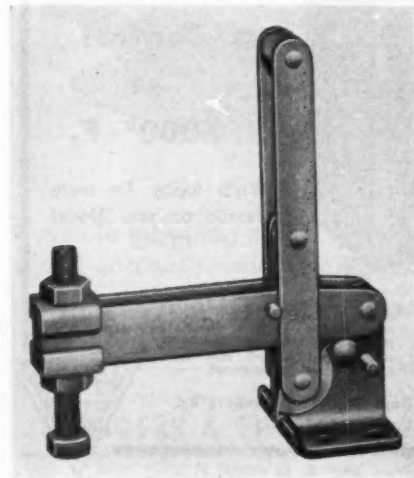
Model V-100, with vertical handle and



horizontal mounting surface, has a clamping force of 100 lbs. with spindle located at end of toggle bar.

Model S-100 is for side mounting and also has a clamping force of 100 lbs. when spindle is at end of toggle bar.

Use ACTION Card, opposite page 64. Encircle No. 40



June, 1954

**HOW TO
INSURE TOP
METALWORKING
PERFORMANCE
for only**



Send for a
trial order of
**ANTI-SCORING
LUBRICANTS**



For top performance on lathe centers, grinding, press fit, stamping, die posts and many other operations—CMD ANTI-SCORING Lubricant can't be beat. It makes your operations smoother, faster, easier, and of course more profitable. Prevents scoring, seizing, galling... all bugaboos in modern machining work. This trial order will start you on your way to top performance where a high pressure lubricant is needed. You will be surprised to find how long it lasts. Get yours today in both oil and grease consistencies.

**TRIAL ORDER—
TWO FOUR OZ. TUBES \$1.00**

Send me my order of CMD right away!

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**CHICAGO MANUFACTURING
AND DISTRIBUTING CO.**

309

Two new speeders for gear inspection

With the addition of two new models to its line of gear speeders, Michigan Tool Co. can now offer a more diversified selection of these machines to its customers.

Both Models 1126 and 1126-A speeders designed principally for production test-



ing automatic transmission gears, Model 1126-A speeder is equipped with individual drive and brake for each spindle to allow for the testing of a set of gears at the same time. Model 1126 speeder has only one spindle, driven while brake loads are applied to the second spindle. A reversible single-speed motor allows the spindle to be driven in either direction.

Sets of gears are tested on the new Model 1126-A speeders by: mounting the sun gear on one spindle and planetary gears on the other, alternately driving each spindle and applying a brake load to its mate. Gears are rotated in the same direction no matter which spindle is being driven. When the gears are meshed, the lock is positive; the gears are released manually when the cycle is completed. Michigan Tool Co., Dept. B, 7171 McNichols Rd., Detroit 12, Mich.

Use ACTION Card, opposite page 64. Encircle No. 41

Water filters

Marvel Engineering Co., of Chicago, makers of Marvel Synchronal filters, have recently adapted all models of their sump and line type filters for water applications. No changes have been made in the basic synchronal design.

Maximum active filter area, longer

PERECO Carbon-resistor type TUBE FURNACE



**Precision
Control
at
5000° F.**

Write today for more
details on this Model
CT-312

Developed to meet the demands of both industry and military. Suited for investigations in the ultra-high (3500°-5000° F.) temperature ranges in the field of either metallurgy or ceramics. Wide range of "turn-down" insures very accurate results. May also be duplicated repeatedly. Capable of holding to plus or minus 20° F. at 5000° F. Choice of ex-

tremely rapid or any slower cycle heat-up; close control of both temperature and power input; full-range, FAIL-SAFE, safety device; and easy low-cost element replacement.

PERENY EQUIPMENT CO.,

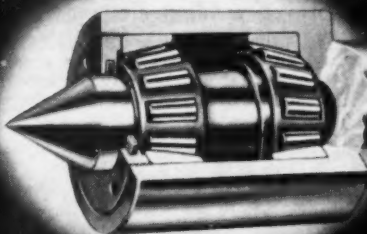
Dept. Y, 893 Chambers Rd.
Columbus 12, Ohio



Standard or Special Furnaces or Kilns from 450° F. to 5000° F.

...precision performance-ALWAYS!

Falls ROTO CENTER



for
lathe and grinder
tail stocks



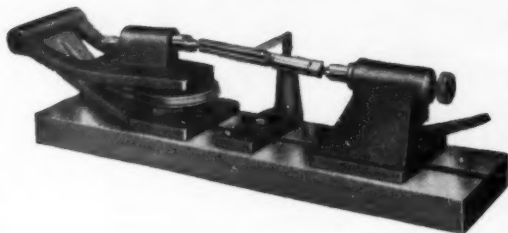
Accurate, low cost turning on tough continuous-run work. Preloaded, matched roller bearings assure rigid set-up. Precision ground shank. Heavy-duty grease seal. Many exclusive features.

FREE BULLETIN 105

"What you should know about LIVE CENTERS"

FALLS PRODUCTS, INC., 122 Genoa Street, GENOA, ILL., U.S.A.

G&F "Sharp-Grind" will save you money



Cut your tool grinding costs by sharpening tools right in your own plant with this time and money saving attachment. Fits most surface grinders with movable bed and the

simple adjusting screw makes it easy to sharpen tapered, spiral and straight reamers, milling cutters and end mills.

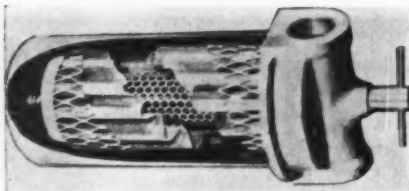
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NAME.....

ADDRESS.....

CITY.....STATE.....

GRINDERS & FIXTURES, INC. 8327 Clinton Rd., Cleveland 9, Ohio



periods of operation, no moving parts, simplicity of maintenance are features claimed. Available for either sump or line installation in eight individual ca-

capacity size units from five to 100 g.p.m. Greater capacities attained by multiple installations. Choice of mesh sizes ranging from coarse 30 to very fine 200 to handle various size particles. Marvel Engineering Co., 625 W. Jackson Blvd., Chicago 6, Ill.

Use ACTION Card, opposite page 64. Encircle No. 42

Improved welding electrode

The Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio, has announced a new electrode which it claims is a new approach to electrode design, repre-

New... Air Drill World's Smallest



It's Really Amazing!

- 3/16" HEAVY DUTY DRILLING
- NEARLY 1/4 H.P. . . . STALLPROOF
- 1/4" LIGHT DUTY DRILLING
- WEIGHS LESS THAN 1 1/2 LBS.
- USES 38% LESS AIR

Highest precision construction makes this drill revolutionary!

Write ARO or see your ARO distributor.

THE ARO EQUIPMENT CORP., BRYAN, OHIO

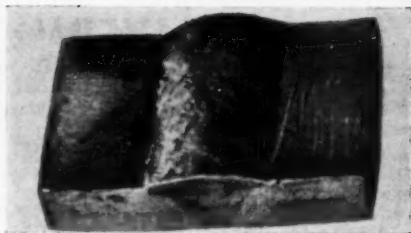
Offices in All Principal Cities
In Canada—Aro Equipment of
Canada, Ltd., Toronto, Ont.

ARO

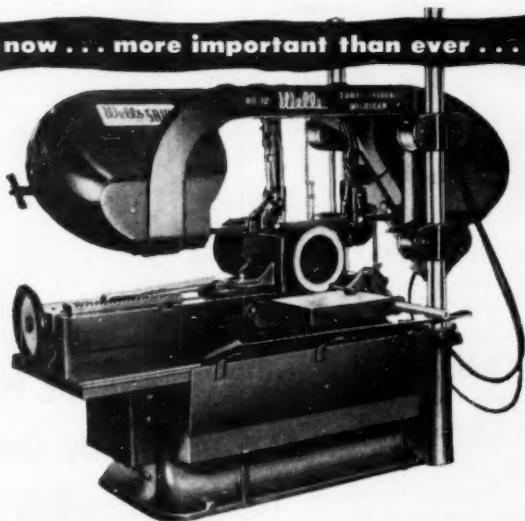
AIR TOOLS

Also . . . AIR HOISTS . . . LUBE
EQUIPMENT . . . AIRCRAFT
PRODUCTS . . . GREASE FITTINGS

senting a step forward in electrode development comparable to the introduction of extruded "shielded-arc electrodes" and the low-hydrogen electrodes. Called Jetweld, it incorporates powdered metal into the electrode coating. This new type of coating uses the heat of the arc more efficiently, and is said to achieve the fastest hand welding speeds ever accomplished with even higher standards of weld quality, appearance and ease of operation.



now . . . more important than ever . . .



the efficiency, economy and dependability of Wells Heavy-Duty Cut-Off Saws

SEARCHING for a way to reduce metal cut-off costs? Here's an answer—the Wells No. 12 Saw. It's a heavy duty, hydraulically operated saw with automatic cutting cycle designed to step up production with greater accuracy. Capacity is 12" x 16", rectangular, 12 $\frac{3}{4}$ " dia., rounds. Ask your Wells Dealer for full information or write direct.



Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
707 COOLIDGE AVE. THREE RIVERS, MICH.

"OLIVER"

VARIETY

Belt Grinder and Polisher

*for finishing
flat, curved
and irregular
surfaces*



This "Oliver" has proved excellent for grinding and polishing irregular shaped pieces of small and medium size—concave and convex surfaces, ornamental metal, mouldings, etc. Ball and roller bearings. Versatile . . . and easy to set up. Offered with belt or motor drive.

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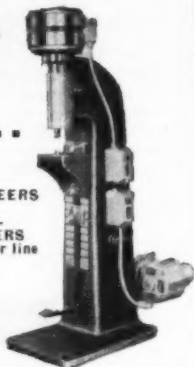
OLIVER MACHINERY COMPANY
GRAND RAPIDS 2, MICHIGAN

GRANT

RIVETERS..



PIONEERS
and
PACE-
MAKERS
in their line



—head rivets from smallest to $\frac{3}{8}$ " diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles.

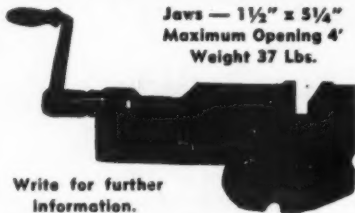
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THE GRANT MFG. & MACHINE CO.
CE Station, Bridgeport 3, Conn.

NEW BRITAIN

SWIVEL VISE

Jaws — $1\frac{1}{2}$ " x $5\frac{1}{4}$ "
Maximum Opening 4"
Weight 37 Lbs.



Write for further
information.

The body is made of semi-steel; the jaws of tool steel hardened and ground. All working surfaces are ground. The vise is as accurate as is possible and the degrees are cut to very close limits.

NEW BRITAIN TOOL & MFG. CO.
13 HARVARD STREET
NEW BRITAIN, CONN., U. S. A.

INCREASE PROFITS by Our Re-Grinding Service



MFGR'S OF
ROTARY FILES
COUNTERSINKS
HIGH SPEED CUTTERS
TUBE BURRING FILES

BEAVER

ROTARY FILE COMPANY
402 E. Slauson Ave., Los Angeles, Calif.

Jetweld is a heavily coated shielded-arc type of electrode meeting the physical requirements of class E-7016 and is used on work formerly calling for E-6012 and E-6020 electrodes on single pass or multiple pass welds. It is especially well suited for horizontal and flat position fillets, horizontal and flat position laps, single and multiple pass butts, deep grooves and corners, cover pass on multiple pass butts. Comes in sizes 5/32", 3/16", and 1/4".

Use ACTION Card, opposite page 64. Encircle No. 43

German universal grinder

The American Herford Corp., Dept. MB, 1546 N. Orleans St., Chicago 10, Ill., announces the availability of the Herford Cresta universal grinder. This unit with swinging internal grinding head is capable of performing o.d. and i.d. grinding on the same setup, with the conversion requiring only seconds. Work head, wheel head, and table are completely universal, allowing taper or straight work on either

Chicago MOUNTED Wheels

... now
even better with
79E BOND

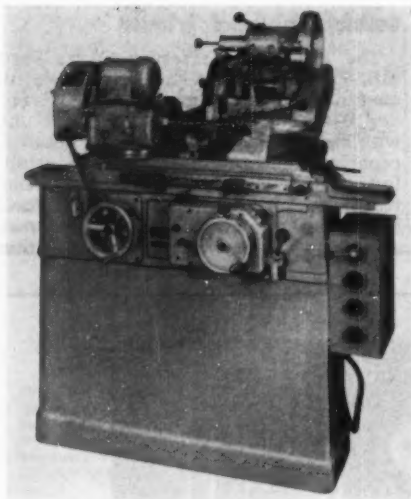
Buy Chicago Mounted
Wheels—bonded with
79E Bond—and you'll
never use any other!

79E—a tough new bond exclusive
with Chicago Wheel—is the sensation
of the industry... it does a **BETTER**
grinding, burring, and finishing job
FASTER. A size and shape for every
use. Deliveries are excellent—Order
today.



CHICAGO WHEEL & Mfg. Co.

Dept. MT • 1101 West Monroe Street, Chicago 7



o.d. or i.d. grinding.

The machine carries a 10" x 1" x 3" wheel powered by a two speed 1 1/4 hp motor. Work head has speeds from 125

to 610 rpm and accommodates live or dead centers, a 4" three jaw chuck or 9/16" capacity quick change collets. Work capacity is 4" x 10" although maximum diameter work for production grinding is recommended as 2".

The machine, incorporating the most recent German production techniques, is best suited for tool room or fast production of small parts.

Use ACTION Card, opposite page 64. Encircle No. 44

Roll-O-Matic air filter

The Roll-O-Matic is an automatic self-cleaning air filter introducing a new adaptation of glass fiber filtering media, designed for use in commercial and industrial ventilating and air conditioning systems to clean both outside and recirculated air. This new filter is said to combine the desirable characteristics of both dry type and viscous impingement air filters—the simple operation and convenient maintenance of the dry type with the large dust holding capacity and higher allowable operating resistance inherent to the viscous principle.

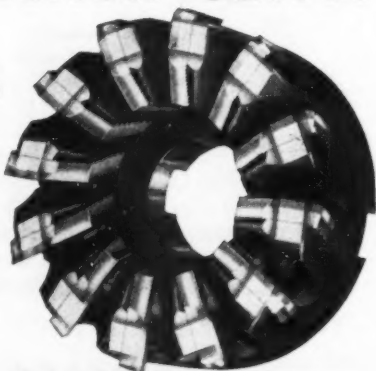
The Roll-O-Matic filtering media is a continuous length of fiber glass material, similar to that used in AAF Amer-glas filters, except that it is supplied in rolls

APEX INSERTED-BLADE METAL-CUTTING TOOLS

Here's a Production Cutter for your

HEAVY DUTY JOBS

APEX offers many cutters for many jobs. Here's one that takes a big chip fast. It can be had with H.S.S., Stellite, Cobalt or Carbide tipped blades. These blades adjust automatically in two directions. No damage to carbide tips. Diameters from 8" to 24". We also make cutters for lighter work. Write for catalog.



APEX TOOL & CUTTER CO., Inc., Shelton 14, Conn.

SAWING
SHAPING



GROB
BROTHERS

GRAFTON WISCONSIN

"DAVIS" KEYSEATERS



are
moderately
priced
Efficient
Economical
Durable

Built in 3 sizes for cutting keyways 1/16" to 1" width. Circular upon request.

DAVIS KEYSEATER CO.
407 1/2 Exchange St. Rochester 8, N. Y.

Greenerd
ARBOR PRESSES

For Assembling
Keyway Cutting
Bore Boring
Piercing
Oil Grooving
Straightening
Forming
Pressing
And many other
jobs



65 Standard styles and sizes

From 1/4 to 20 tons pressure for manually operated presses

From 1 1/2 to 75 tons pressure for motor driven hydraulic presses

Originators of the Arbor Press

Send for Cat. 40-H

GREENERD ARBOR PRESS CO.
141 CROWN ST. • NASHUA, N.H.

LINLEY
noiseless
RIVETING MACHINES



Cut time and cost in rivet spinning

These fast, sturdy, easily operated machines put your riveting on a production basis in terms of speed and low cost. We'll gladly demonstrate what they can do and the high quality of work they turn out. Send samples of your parts to be riveted and we'll give you time and cost estimates on handling your rivet spinning on a LINLEY.

Sizes and types for iron and cold rolled steel rivets up to 3/4"; larger capacity for rivets of softer materials.

Send TODAY for bulletin N

LINLEY BROS. CO.
673 State St. Ext. Bridgeport 1, Conn.

of approximately 70 linear feet. The material from the roll of clean media, mounted at the top filter casing, is transported on a continuous screen that rotates over top and bottom sprockets, down the face of the filter and is rerolled at the bottom after collecting its dust load.

A pressure switch sensitive to the resistance differential across the filter curtain actuates a drive motor that rotates the screen and feeds a certain amount of clean media into the filter curtain when the resistance reaches a predetermined point. In this way media usage is in direct proportion to dust conditions and hours



Air-O-Chek
THE VALVE WITH
THE INTERNAL
FULCRUM LEVER

Model FA

Model A

For blowing chips from work — For cleaning out hollow sets, machine recesses and tee slots — For drying parts before inspection and for many similar uses, Air-O-chek is the Air-gun.

Write for details.

AIR-WAY PUMP & EQUIPMENT CO.
1054 N. Kilbourn Ave. Chicago 51, Ill.

of operation. Field tests indicate that under normal operating conditions a single roll of media should be a year's supply per 10,000 cfm of filter capacity. American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.

Use ACTION Card, opposite page 64. Encircle No. 45

Improved cutting oils

Sun Oil Co., Dept. MT-9, 1608 Walnut St., Philadelphia 3, Pa., has announced an improved series of Sunicut "W" cutting oils. These contain Sun's all-petroleum, polar compound—Petrofac, said to give cutting oils metal-wetting and oiliness properties similar to those obtained with animal and vegetable oils. It doesn't turn rancid or support the growth of bacteria that cause skin irritations. Other features include: Odorless and lighter in color; easy to see through. The company has also made several major improvements in its emulsifying cutting oil. Improved S.E.C.O. is said to mix easier with hot, cold, and hard water . . . forms whiter and more stable emulsions. Lower viscosity makes it easier to handle; increased detergency improves efficiency as a grinding oil.

Use ACTION Card, opposite page 64. Encircle No. 46



CUT COSTS with ALLEN Punch Press

**1-Ton Power Bench Type.
Powerful, Dependable, Economical.**

For light work—stamping, forming, riveting, etc—metal, fiber or other material.

Overall height 17 1/4" . . . Base size 8 1/2"x8 1/2" . . . Die Bed 5 1/2"x8 1/2"
Ram face 1 1/2"x3 1/2" . . . Ram Stroke 3/4" . . . positive 3/4" ram
adjustment . . . sturdy, single pin, non-repeat hand lever clutch . . .
V-belt drive . . . weight 105 lbs. Requires only 1/4 to 1/2 H.P. motor.

The machine of a thousand uses! Adequate for many types of work now done on large presses at greater expense.

30-Day Money-Back Guarantee. Order TODAY. Price \$97.50 F.O.B. Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley, less motor).

ALVA F. ALLEN, Dept. MTB, CLINTON, MO.

Norton announces automation in precision grinding of crankpins

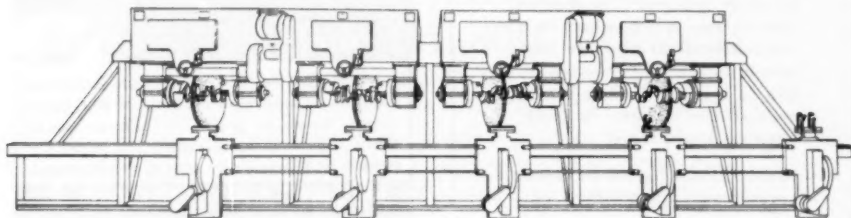
The highest form of automation in metal-working today probably exists in the automobile industry where castings of engine parts leave the foundry and proceed through the various machining operations without a human hand touching them. However, precision grinding has resisted efforts at automation because it has not been possible to obtain the close tolerances required of mating parts without human attention.

At the present time, Norton Co., Dept. B, Worcester 6, Mass., is building two transfer type crankpin grinders. These machines have been designed to mechanize all the manual duties of the operator,

as well as grind accurately, and are said to do the work of five to seven men. As the crankshaft proceeds from one grinding station to the next, succeeding journals are ground until the shaft is finally deposited on a conveyor line, completely ground.

An important feature of the grinder is automatic truing of the grinding wheels at predetermined intervals. As the wheel is trued, there is an automatic compensation made in the wheel feed mechanism for the reduction in diameter of the grinding wheel.

An arrangement for automatically inspecting each crankpin after it is ground



REHNBERG-JACOBSON DRILL UNITS

Self-contained Drill Units are fully-automatic and cam-operated for positive quill action. They come in five sizes with drill capacities ranging from 3/16" to 1-1/2" (in mild steel).

These units are all available for quick delivery. You can mount them on structures of your own to make practical and efficient production machine tools.

Write for Literature

REHNBERG-JACOBSON MFG. COMPANY

DESIGNERS & BUILDERS OF
SPECIAL MACHINERY



2135 KISHWAUKEE ST.
ROCKFORD, ILLINOIS

MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.



NO OTHER GAUGE
COMPARES FOR
FAST, ACCURATE
LAYOUT AND
MEASURING

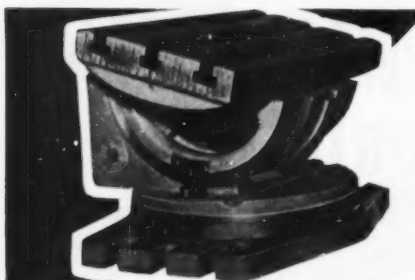
Capacities to
6" when used
with this
Fairfield Gauge
3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scribe for fast layout, or insert dial indicator for quick, accurate inspection.

Exclusive distributor for U.S. and Canada:

CLEVELAND INSTRUMENT CO.

735 Carnegie Ave., Cleveland, O.



BAKEWELL ANGLE PLATES HAVE

- **Tilttable Tables** . . . 7 degrees past the vertical and horizontal positions
- **Exacting Accuracy** . . . All parts precision machined and fitted

Available sizes are:

5-3/16" x 10 3/4" table, Type A1, price . . . \$166.50
7" x 14" table, Type A2, price . . . \$199.50

Write for further information—today

Dayton & Bakewell, Inc.

1939 Santa Fe Ave., Los Angeles 21, Calif.

Micro *Supreme* LAY-OUT AND IDENTIFICATION DYE

7 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

**MICHIGAN CHROME &
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PORTABLE ELEVATING TABLE



**Saves
TIME
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LABOR**

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15 1/2", leaving operator's hands free. Table swivels and locks in any position.

**SEND TODAY FOR ILLUSTRATED
CATALOG NO. 2**

MIDWEST TOOL & ENG. CO.

112 WEBSTER ST., DAYTON, OHIO

is also available. A system of lights controlled by the inspecting device warns the operator when the ground size of the shaft approaches either the high or low limit of the allowable tolerance. Adjustment of wheel position to correct the error is then made by the operator.

Movements of the transfer equipment are operated hydraulically with electrical interlocks to insure proper sequence and to stop the whole procedure should any part of the transfer or grinding equipment fail. Movements are timed and con-

jar and to travel rapidly between stations, trolled to stop and start without noise or

Grinding time for a complete crankshaft, including all the crankpin journals and adjacent shoulders, is claimed to be comparable to that of a good operator working at top speed on a modern conventional type of crankpin grinder grinding a single crankpin. Being completely automatic, the machine operates at close to 100% efficiency all the working day. The machine can be preset to operate at

Continued on Page 331

HOW TO MAKE PROFITS FROM SMALL HOLE DRILLING!

CLEVELAND-MUNDING BENCH RADIAL DRILL combines the CONVENIENCE and ACCURACY of a sensitive drill and the RANGE and

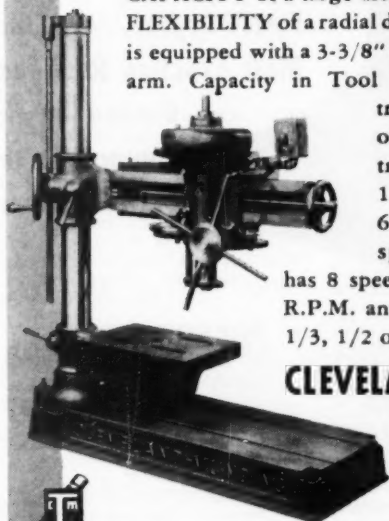
CAPACITY of a large drill with the SPEED and FLEXIBILITY of a radial drill. The Bench Radial is equipped with a 3-3/8" dia. column, has a 24" arm. Capacity in Tool Steel—1/2". Vertical

travel of arm on column of 25" and horizontal travel of head on arm of 18". Spindle travel of 6-1/8" and #2 M.T. in spindle. The spindle

has 8 speeds from 160 to 3140 R.P.M. and is equipped with a 1/3, 1/2 or 3/4 HP Motor.

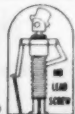
CLEVELAND-MUNDING BENCH RADIAL DRILL

Write today for
Folder No. BB-64



CLEVELAND
tapping machine co.

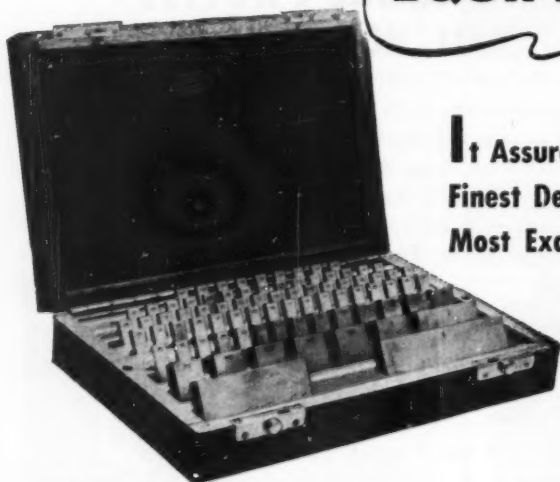
A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC. • CANTON 6, OHIO



For Extreme
Accuracy →

You Can Depend on

JOHANSSON GAGING EQUIPMENT



**It Assures You Precision to the
Finest Degree, — to Meet Your
Most Exacting Requirements —**

**Backed by the Name
Supreme in the World
of Measurement.**

- **GAGE BLOCKS**

(JOHANSSON) and accessories. Short deliveries. Inspection and reconditioning service available at our plant.

- **INTERNAL INDICATORS**

(or inside measurements .155 to 24 inches). Scale range plus or minus .001 graduated to .0001 and minus .020 graduated to .0001.

- **MIKROKATOR**

(Amplifier — for outside measurements) Graduations .0001 to .000002 or .001 M to .0002 M.

- **OTHER JOHANNSON
PRODUCTS**

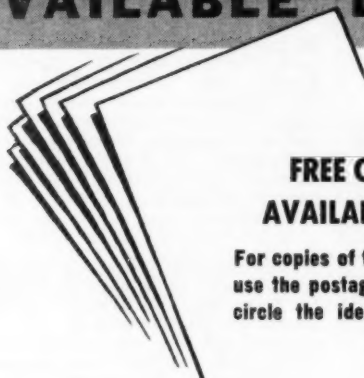
Micrometers, Snap gages, Extensometers, Dynamometers, Hardness Testers, Surface Finish Indicators.

Write for Literature

C. E. JOHANSSON GAGE CO.

10841 HAGGERTY AVENUE, BOX 4086 NORTHEASTERN STATION, DEARBORN 1, MICH.

AVAILABLE LITERATURE



FREE CATALOGS AND BULLETINS AVAILABLE FROM MANUFACTURERS

For copies of the literature in which you have an interest use the postage-paid postcard on the next page. Merely circle the identifying numbers and mail the postcard.

1. Power Transmission Equipment. Variable speed pulleys, wide V-belts, sheaves, motor bases, countershafts, Select-O-Speed transmissions are featured in new 24-page catalog of the Lovejoy Flexible Coupling Co., 5029 W. Lake St., Chicago 44, Ill. The company provides a complete line of variable speed equipment from fractional hp to 8 hp with a maximum speed ratio of 10 to 1 at 1750 rpm. No stopping of production for speed changes.

2. Hydraulic Drive for all ram type turbines, product of Lynn Mfg. Co., Dept. BB, 1121 S. 7th St., Minneapolis 4, Minn., is described and illustrated in folder published by the manufacturer. Drive is said to guarantee 20% saving in production costs, regardless of size of jobs.

3. Speed Reducers. Streamlined design of Euclid speed reducers, Euclid Universal Machine Co., Dept. MB, 29940 Lakeland Blvd., Wickliffe, Ohio, is aimed at achieving economies in installation and operation. Cast aluminum housings reduce weight. All gearing is cut 20° pressure angle, insuring greater torque and horsepower capacity. Catalog No. 254.

4. Parallels & V-Blocks. Catalog sheet issued by Grover-Sayle Co., Dept. B., 8205 Clinton Rd., Cleveland 9, Ohio, describes parallels and V-blocks for magnetic chucks. Construction features include: positive mechanical lock non-shift laminations; spring temper phosphorous

bronze non-magnetic laminations; V centered and ground parallel to base; 1/8" end laminations welded and ground square.

5. Hand Grinder. The new Dumore Series 35 precision hand grinder, 35,000 rpm, is featured in circular published by Dumore Precision Tools, The Dumore Co., 1337 17th St., Racine, Wis. Mills, grinds, polishes, and finishes materials ranging from wood to high alloy steels. High sustained torque, wheel capacity up to 1" vitrified bond, bur capacity up to 3/8" in dia.

6. Expanding Mandrels. A 4-page descriptive folder covering their line of Count-Centric expanding mandrels and Thor-alloy drop forged C-clamps has been issued by the Le Count Tool Works, Inc., Dept. B, 360 Capitol Ave., Hartford, Conn.

7. Hydraulic Power Unit. The latest type hydraulic power unit for push-button control of Kling friction saws is described in a bulletin just issued by Kling Bros. Eng. Works, 1320 N. Kostner Ave., Chicago 51, Ill. Units are of the semi-automatic feed control type, can be used with either new or old saws.

8. Milling Machines. Ten newly issued leaflets covering the Cervinia milling machines in various sizes are obtainable from Misal Machinery Co., 1 E. 53rd St., New York 22, N.Y.

9. Mill Heads. for vertical, angular and compound angle work on horizontal mills, are subject of 15-page leaflet issued by Rusnok Tool Works, Dept. BB, 4840 W. North Ave., Chicago 39, Ill. Also included are brackets, parts and tools.

10. Snap Ring Groove Gages. Catalog 54-D, Reliant Industries, Dept. B, 4947 Firestone Blvd., South Gate, Calif., describes the manufacturer's gages for dimensional control of internal snap ring grooves. Prices and gaging specifications of single gages are also given.

11. Electrification System. Feedrail Corp., Dept. MB, 125 Barclay St., New York 7, N.Y., has issued a 44-page bulletin (No. 40) cataloging their 100 ampere steel-enclosed trolley busway system of electrification. Describes track, trolleys, accessories used in electrification of cranes and hoists, assembly and production lines, moving test lines, portable and machine tools, etc.

12. Milling Fixtures. Hart milling fixtures, product of Walter W. Field & Son, Inc., Dept. B, 29 Hayward St., Cambridge 42, Mass., hold round, hexagonal, octagonal or square stock. Made in four sizes; can be used either in horizontal or vertical position for straddle or end milling. Bulletin available from the company.

13. Gun Drills. A complete compilation of the latest information on the history and application of gun drills in industry is available from the Eldorado Tool and Mfg. Corp., Dept. BB, Milford, Conn. Booklet gives reasons why this early drilling method, after being discarded for many years, is now being used to solve difficult drilling problems.

14. Circularity-Grinding Attachment. A descriptive booklet issued by the Detroit Reamer & Tool Co., Dept. MB, 2830 E. Seven Mile Rd., Detroit 34, Mich., depicts their Model 500 improved circularity-grinding attachment, for producing and reworking cutting tools. Simple setups permit grinding of form relief, radial relief, form and radial together, tapered cylindrical and straight cylindrical.

15. Right Angle Irons, Angle Plates. Folder issued by Steelton, Dept. MB, 630 W. 17th St., Costa Mesa, Calif., pictures and describes six-way right angle irons and

angle plates. Precision ground and polished to within .0005" in six inches.

16. Stub Reamer. Bulletin No. 15, Twentieth Century Mfg. Co., Route 176 and Bradley Rd., Libertyville, Ill., presents the Supream stub reamer in decimal sizes, for screw machines, turret lathes and drill presses. Reamers are made of high-speed 18-4-1 steel. Machined surfaces are ground after heat treatment to prevent clogging or freezing of chips in the flutes.

17. Cutting Oils. "Aladdin had something there," says an attractive leaflet issued by Fiske Bros. Refining Co., Dept. B, 129 Lockwood St., Newark 5, N.J. "He had only to rub his magic lamp to get his every wish gratified," the folder continues. "Even so, his results were no more remarkable than those achieved by modern industry's magic lamp—research." What has been developed by Fiske in the cutting oil field through research is subject of literature.

18. Safety Guards for Punch Presses. Circular illustrating safety guards manufactured by Searjeant Metal Products, Inc., Dept. B, Box 1053, Mendon, N.Y., has been released. Included are: adjustable basket guard; non-repeat mechanism; end zone barrier; single-sweep guard; double-sweep guard.

19. Tool Holder. Descriptive leaflet and price specifications sheet on tool holder manufactured by Brookfield, Inc., Dept. BB, Stoughton, Mass., will be sent to those requesting them. Holder available in eight models with holding ranges up to one inch.

20. Materials Handling Equipment. A new 48-page catalog is announced by Palmer-Shile Co., Dept. B, 16021 Fullerton, Detroit 27, Mich. Several new products are described: steel boxes with lap joints; stand and reel for handling steel coils; nesting stacking box; skid box with side door.

21. Fly Screen Looms. Bulletin No. 9852, Mummert-Dixon Co., 122 Philadelphia St., Hanover, Pa., describes and illustrates their looms for production of wire cloth. Direct motor drive alleviates loss in belt slippage or slow pickup in starting.

22. Drill Presses. Light-heavyweight 20" drill presses, hand or power feed, are

featured in colorful folder of Walker-Turner Co., Dept. MTD, 900 North Ave., Plainfield, N.J. Press has one-piece cast iron head; a 10-spline spindle 1" in dia.; and 4 heavy-duty precision ball bearings.

23. Motor-Spindle Drilling. The Edlund Machinery Co., Dept. BB, Cortland 20, N.Y., has released its new illustrated Bulletin 150, describing the improved Model M.S. motor spindle drilling and tapping machines: Model 2-M.S. for general production and tool room use, and Model 4-M.S. for heavy work. Booklet shows possible combination arrangements, using Edlund attachments, to adapt machine to meet specific requirements.

24. Dial Indicators. A colorful 6-page bulletin on the complete line of Nilcoid dial indicators with new movements and pointer-line dials has been issued by the manufacturer, the Nilsson Gage Co., Inc., 225 Mansion St., Box 505, Poughkeepsie, N.Y. Movement contains only four moving parts and eliminates conventional gear train. A rocker arm with lapped surface rotates a helix spindle with a wiping action, cleaning off dirt and grit that imperil accuracy.

25. Spindle Ideas. Catalog of the Whitton Mfg. Co., Dept. B, New Britain, Conn., describes, with diagrams, the applications of their high production spindles with various makes and styles of grinding machines.

26. Heat Exchangers. Bulletin No. 120, Niagara Blower Co., Dept. B, 405 Lexington Ave., New York 17, N.Y., describes the operation of the Niagara Aero heat Exchangers used in cooling or controlling temperatures of industrial liquids. Diagrams and photographs show operation and applications.

27. Broaching Machines. The American Broach & Machine Co., Dept. BB, Ann Arbor, Mich., has issued seven booklets describing the company's various models of broaching machines: Type T-3 way; 36" rotatory continuous surface; Type H horizontal hydraulic; Type H 2-30 horizontal hydraulic; HDE horizontal, 15 to 60 ton capacity; Model VP, vertical pull-up internal; vertical hydraulic surface.

28. Tenth Plug Gages. A set of 25 tenth plug gages, neatly nested in a plastic

case, is described in literature issued by the manufacturer, the Deltronic Corp., Dept. BB, 9010 Bellanca Ave., Los Angeles 45, Calif. Sets are available in fractional nominal sizes from $\frac{1}{8}$ " to 1" in increments of $\frac{1}{64}$ ".

29. Small Businesses. New booklets available from the Small Business Administration, U.S. Superintendent of Documents, Dept. BB, Washington 25, D.C., are: "Making Your Sales Figures Talk," 20 cents; "Getting Your Product on a Qualified Products List"; "Appraise Your Competitive Position to Improve Company Planning"; "How to Build Your Sales Volume"; "Essentials of Good Plant Lubrication"; "Judging Your Purchasing Efficiency."

30. Hand Tools, Files. A complete line of tools, including carpenters', machinists', and farriers', and special hammers, are covered in a comprehensive catalog, No. T-153, published by Heller Bros. Co., Dept. B, Newcomerstown, Ohio. Catalog No. 100 includes information on the Nucut wavy-teeth file, which combines fine and coarse teeth by a planned irregularity.

31. Drop Forgings. A new informative booklet on drop forging has recently been issued by the Billings and Spencer Co., Dept. B, Laurel St., Hartford, Conn. Printed in two colors, it contains a brief history of the company, a short description of how drop forgings are made, and useful information on the company's facilities.

32. Heat Treating Aluminum Alloys. Metallurgy involved in the heat treatment of aluminum alloys is covered in a simplified, nontechnical manner in a special section of the new manual, "Heat Treating Aluminum Alloys," just published by Reynolds Metals Co., Dept. B, 2500 S. Third St., Louisville, Ky. The discussion presents the underlying principles having to do with the metallurgy and heat treatment of aluminum and its alloys. Price \$1.00. The manual will be sent without charge to engineers, metallurgists, instructors, and technical men requesting it on company letterhead.

33. Dimensional Metrology. "A Review of Pneumatic Dimensional Gages," a paper presented by Louis Polk, chairman and president of the Sheffield Corp., at the symposium on engineering metrology,

THIS HELPFUL LITERATURE NOW AVAILABLE

sponsored by the National Physical Laboratory in London, Oct., 1953. The treatment covers a wide-spread range, and is related to the entire broad field of metrology rather than just to pneumatic gaging. The Sheffield Corp., Dept. B, Dayton 1, Ohio.

34. Industrial Plastics. Available from Joseph T. Ryerson & Son, Inc., Dept. B, Box 8000-A, Chicago 80, Ill., is a newly published 16-page illustrated bulletin on industrial plastics. It has data on the manufacture, grades, properties, fabrication, and use of laminated plastic sheets, tubes, rods, special shapes, etc.

35. "Changing the Shape of the Future with Carbonyl Created-Metals" is a beautifully designed piece of literature showing the impact of created-metals on America's manufacturing life, both in the past and in the future. Write to Carbonyl Department of General Electric Co., Dept. BB, Detroit 32, Mich. A new manual that explains what Thermistors are, how they are applied, etc., is also available.

36. Standard Drill Jig Bushings. For holders of Ex-Cell-O complete catalog binders, the Ex-Cell-O Corp., 1212 Oakman Blvd., Detroit 34, Mich., has issued Catalog No. 35936 and Price List No. 35138 on their A.S.A. standard drill jig bushings. All previous catalogs and price lists on this product should be destroyed. S-length bushings, formerly listed as specials, are now standard.

37. Low Carbon Ground Flat Stock, product of Marshall Steel Co., P.O. Box 108-BB, La Grange, Ill., claims savings up to 60%. It is offered in 190 sizes in 24" lengths from stock. A grinding service is also available, from low carbon strip and plate ranging from .088" to 6" thick, 25" wide and 98" long. Catalogs sent to those requesting them.

38. "The Traub Story in 60 Seconds," distributed by the Guthery Machine Tool Corp., Dept. B, 130 W. 42nd St., New York

36, N.Y., features the Traub turning and copying automatic with Swiss-type guide bushing support. Copying template holder is standard equipment. Catalog contains a detailed description of the design, construction specifications, applications.

39. Drill Unit, Holomatic Model 14, manufactured by Hause Engineering, Dept. BB, Montpelier, Ohio, is shown in their latest brochure. Air actuated, completely automatic in advance and retract motions; weighs 30 lb.

40. V-Belts. Super-Power V-belts are described in a folder recently issued by Raybestos-Manhattan, Inc., Manhattan Rubber Div., 61 Willet St., Passaic, N.J. Belts are claimed to offer a 40% increase in hp cap., resistance to shock loads, and length stability. Specify Bulletin No. 6628.

41. Slide Rule. A new slide rule giving speeds and feeds for milling operations is offered by Clarkson, Inc., Dept. BB, 320 Ontario St., Toledo 2, Ohio. Readings are given for tough steel, medium steel, cast iron, phosphorous, bronze, mild steel, brass and aluminum, and are conservative for Clarkson cutters. Rates given should be used as a starting point from which to work up to the maximum speed and feed.

42. Cut-Off Blades. The American Cam Co., Dept. BB, Hartford 1, Conn., has added Amcam-X cut-off blades to its line of screw machine tools. Blades are fabricated from a special cast steel alloy, are available to fit standard holders. Literature available from manufacturer.

43. Press Room Equipment. Durant Tool Supply Co., 155-D Orange St., Providence, R.I., has issued a new flyer sheet showing several units of their line of press room equipment. It gives a capsule run-down on each of the items: stock straighteners; roll feeds; scrap choppers; motor driven straighteners; slide feeds; stock reels; wire straighteners; stock oilers.

44. Dust Control. Simplified dust control system for collecting three different kinds of dusts in a small shop is the subject of Bulletin 640-2 issued by Agat-Detroit Co., Dept. BB, 502 Main St., Ann Arbor, Mich. Bulletin discusses control of emery dust, dust from a rough grinding operation, lint from a buffer.

45. Power Press Brakes. A new catalog presenting their complete line of Metalworker power press brakes has been is-

SENT FREE UPON RETURN OF POSTAL CARD

sued by Airtherm Mfg. Co., 762 S. Spring Ave., St. Louis 10, Mo. Included are: specs., applications possible with various dies; description of design of brakes; optional features.

46. Inclined Presses. Niagara open back inclined presses, Series AA, featuring electro-pneumatic clutch, are described and illustrated in Bulletin 57-A, Niagara Machine & Tool Wks., 637 Northland Ave., Buffalo 11, N.Y. Stock may be fed from either side or from front or back. Work can be discharged through the opening in the bed or through the opening in the back.

47. Precision Cap Screws. A 4-page illustrated catalog, "Chandler Precision Cap Screws," Chandler Products Corp., Dept. B, 1436 Chardon Rd., Cleveland 17, Ohio, features a representative variety of the company's fasteners: special automotive bolts; place self-locking bolts for assemblies subject to excessive stress and vibration; connecting rod bolts, etc.

48. Clamps. The Cincinnati Tool Co., Dept. BB, Norwood, Cincinnati 12, Ohio, has published a new clamp catalog, No. C-50, which furnishes selection and application information on all types of clamps.

49. Vise. Black Drill Co., Inc., 1374 E. 222nd St., Cleveland 17, Ohio, has issued a bulletin describing and illustrating the Black Centr-Finder vise and its uses. A relatively new precision device for locating centers or other pre-determined points on work of any shape.

50. Diamond Tool Industry. "The Diamond Tool Industry in 1953" is a survey summarizing important changes and developments. Apart from actual diamond tools it also deals with more scientific aspects, in particular investigations into the properties of diamond. Write to Industrial Diamond Information Bureau, St. Andrew's House, Dept. BB, 32 Holborn Viaduct, London, EC1, England, for both survey and bibliography of industrial diamond applications.

51. Solenoid-operated Production Tools. A catalog containing complete information on the Electropunch, Electrostake, Electropress, and accessories, and showing typical applications, is available from Black & Webster, Inc., Dept. BB, Newton 58, Mass.

52. Coolant Pumps. The Ruthman Machinery Co., Dept. BB, 1816 Reading Rd., Cincinnati, Ohio, have published a com-

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prehensive and attractive new catalog featuring the Gusher coolant pumps as well as other types. Some features of the Gusher pump are: totally enclosed drip-proof motor, electronically balanced rotating assembly to cut vibration to a minimum, no metal to metal contact within the pump.

53. Rubberized Abrasives. A treatise on the adaptability and application of rubberized abrasives, together with complete specs., is contained in Catalog No. 53, Cratex Mfg. Co., Dept. BB, 81 Natoma St., San Francisco 5, Calif. Abrasives are available in wheels, points, blocks, sticks and cones for machine or hand operations.

54. Lathes. A 36-page facilities book featuring Axelson lathes is ready for distribution. Featured are the Axelson foundry, engineering and design departments, metallurgical control and machining operations. A catalog of the lathes is also included. Write Advertising Dept. B, Axelson Mfg. Co. Div., Pressed Steel Car Co., Inc., 6160 S. Boyle Ave., Los Angeles 58, Calif.

55. Water-Mix and Grinding Fluids. A 16-page booklet on the proper selection and application of four different water-mix cutting and grinding fluids, the D. A. Stuart Oil Co., Ltd., 2727 S. Troy St.,

Chicago 23, Ill., is available from the company.

56. Surface Plates. The Herman Stone Co., Dept. B, 324 Harries Building, Dayton, Ohio, has issued a 4-page folder describing its complete line of surface plates. Tells why pink granite is used, and gives information on sizes of plates and accessories.

57. Machine Tool Spindle Bearings. A machine tool spindle bearing manual which outlines the fundamental principles involved in the maintenance of machine tool spindles is being distributed by United Motors Service Div. of General Motors, Dept. BB, GM Bldg., Detroit 2, Mich. Manual illustrates, step by step, both dismounting and assembly of ten typical ball bearing supported spindles.

58. Stock Gears, speed reducers, special gears are cataloged in literature of Grant Gear Wks., Inc., Dept. BB, Boston

27. Mass. Request Catalog No. 70; 176 pages containing descriptions, photographs, specifications.

59. Machine Tool Attachments. Handy catalog of the Toolmaker line, Montgomery and Co., Dept. BB, 7 Tichenor Lane, Newark 5, N.J., has recently been issued.

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MACHINE and TOOL BLUE BOOK

JUNE, 1954

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35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
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10,000 IN USE Accepted by all leading manufacturers as the speediest, most versatile portable engraver. Only the NEW HERMES has these patented features:

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- Self-centering holding vise.
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- Adjustable copy holders.

Send for Catalog No. IM-28, describing full line of Engraving Machines including HEAVY DUTY BENCH TYPE MODEL (200 lbs.)

NEW HERMES ENGRAVING MACHINE CORP.

13-19 University Pl., New York 3, N. Y.

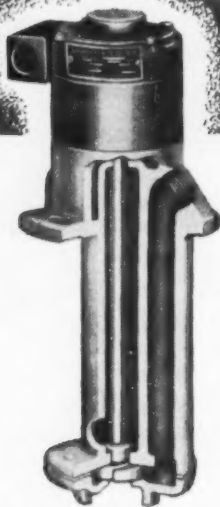
60. Broaches and Fixtures. Simulated leather loose-leaf manual of the Conant Broach Co., Dept. BB, 355 W. 107th St., Chicago 28, Ill., describes the advantages and applications of broaching. Also included is information on types of broaches, broach cutting action, broachability of materials, broach design, broach sharpening, and facts needed to design, manufacture and quote broaches.

61. Pumping Unit. The Modernair Corp., Dept. MB, 400 Preda St., San Leandro, Calif., has issued a new catalog sheet

describing the Series DU low pressure hydraulic pumping unit for Modernair equipment. Features: 200 psi, 2½ gal. per min., 115/230 volt 1/3 hp motor with capacitor, 5 gal. circular square-bottom reservoir, dip stick and air filter, 19¾" high and 12" in dia., weight 35 lb.

62. Filters. The Marvel synclinal filter for water is explained and pictured in newest literature of the Marvel Eng. Co., Dept. BB, 625 W. Jackson Blvd., Chicago 6, Ill. Filter claims 2½ times more active filtering area, less flow restriction. Syn-

you can save money on



(cutaway view)

MODEL 7500 the best available for long trouble-free machine tool service.

DESIGNED AND BUILT FOR
your specific job

Designing special pumps for specific jobs has been a Brady service for many years. Brady small centrifugal pumps are currently being used as original equipment by leading manufacturers of air conditioning, refrigeration, dairy, machine tool and many other industries. If you have a pump problem or would like a recommendation on your pump requirements, write to our Engineering Department. There is no obligation, of course, and literature on our regular line is also available.

Brady CORPORATION 1007 E. 18th Street
Muncie, Indiana

clinal design is incorporated in both the sump and line type units.

63. **Keyseater.** Catalog - price list distributed by the D. C. Morrison Co., Box 1017-C, Cincinnati 1, Ohio, details features of their 1" keyseater. Work is fed into the cutting tool and the single cutter takes the cut the full length of the work before backing out; not a sawing operation, but a cutting stroke.

64. **Drilling and Tapping Units.** HyPneu-Mat Inc., Dept. BB, 647 W. Virginia St.,

Milwaukee 4, Wis., has issued Bulletin No. 42-1-54 describing and illustrating the company's units for centering, tapping, drilling, reaming, end milling, chamfering, multi-spindle drilling, and counter-boring. Sealed unit construction permits mounting in any position with pulley or direct motor drive.

65. **Drill Jig Bushings,** carbide inserted, product of the W. F. Meyers Co., Inc., Dept. B, Bedford, Ind., are featured in the manufacturer's new catalog. Made to A.S.A. standards in headless press fit,

FOR "SPECIAL" CUTTERS AT STANDARD

PRICES!

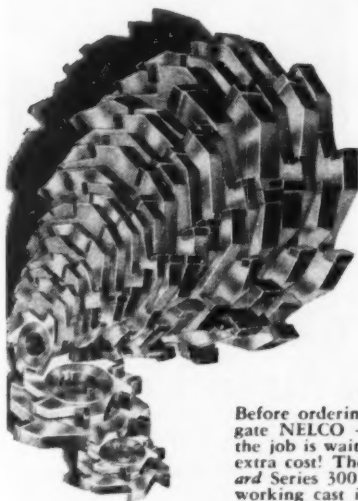


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NELCO TOOLS ARE
REGULARLY STOCKED TO
FILL 90% OF ALL SPECIAL
TOOL APPLICATIONS!



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THE NEW NELCO
48 PAGE CATALOG



Before ordering costly *special* cutters, investigate NELCO — chances are the tool to do the job is waiting — without delay! Without extra cost! There are, for example, 47 *Standard* Series 300 Nelco Side Milling Cutters for working cast iron, brass and bronze. 6 teeth to 24 teeth — diameters from 3" to 12" — teeth graduated from 3/32" to 1" in width — from 1" to 2" hole diameter. Throughout the entire Nelco line, this same versatility and utility holds true. Other *standard* Nelco carbide tools in stock — saving dollars on special cutters — include

- | | |
|------------------------------------|-------------------------------------|
| 130 Different Side Milling Cutters | 40 Different Face Milling Cutters |
| 37 Different Slitting Saws | 25 Different Shell End Mills |
| 171 Different End Mills | 189 Different Carbide Tipped Drills |
| 21 Different Slab Milling Cutters | |

NELCO TOOLS

For that Extra
EDGE in Production

NELCO TOOL COMPANY, INC., MANCHESTER, CONNECTICUT

head press fit, slip and fixed renewable types, as well as to special specifications.

66. Leak-Testing. The Moore system for production leak-testing is described in Bulletin AB-4, Moore Products Co., Philadelphia 24, Pa. Testing is accomplished by measuring the drop-off in pressure, at the end of a predetermined interval, after the chamber of the workpiece is filled with air at a higher-than-atmospheric pressure.

67. Tapping and Threading Equipment. Various models of hand tappers are de-

tailed in bulletin of the Lassy Tool Co., 108 Bohemia St., Plainville, Conn. Universal tap and die guide is also included. Guide bar fits any $\frac{1}{2}$ " chuck; wide range of accessories available.

68. Sine Plate. Flyer issued by the Bald Eagle Tool Co., Dept. BB, 357 Minnesota St., St. Paul, Minn., describes the new sine plate manufactured by the company. Plate is broader to provide greater stability. Cast iron body is double normalized and precision ground. Folder contains detailed instructions on the use of a sine plate.

The Versatile BD Wheel
is used for weld grinding,
deburring, notching, slot-
ting, cutting-off, etc.

Norton **REINFORCED** **WHEELS...**



4 Great Team-Mates **for your "TOUCH OF GOLD"**

Here's the line-up: Two hub-type wheels (BD rigid and BFR semi-flexible); one straight wheel (BF semi-flexible); one cut-off wheel (BN).

Add outstanding versatility to strength and to safety, multiply by four and you'll know why this Norton team rates as the "Big 4" among reinforced wheels. Together, they cover an endless list of applications, ranging from light finishing to cutting wire rope. And they do every job with the extra safety, service life and economy that add the real "Touch of Gold."

See your Norton Distributor for the reinforced wheels you need.

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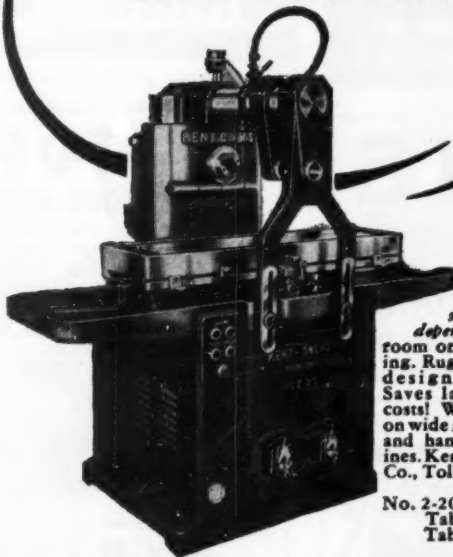
69. Variable Speed Polishing Lathes. By keeping peripheral speed constant, increasing the rpm as wheels wear down, Hammond's variable speed polishing lathes claim to give more uniform finish. Machine adjusts spindle speeds instantly, from 1500 to 3000 rpm, when speed indicator dial is turned. Write for Bulletin No. 635, Hammond Machinery Builders, Dept. BB, Kalamazoo, Mich.

70. Press Brakes. Heavy-duty Series 35 press brakes, in five standard sizes, are the subject of new bulletin issued by Royal Press Co., Dept. B, 548 W. Monroe

St., Chicago 6, Ill. Applications include V forming, offset forming, punching, blanking, radius forming, notching, corrugating, drawing, curling, flanging, hemming, flattening, seaming, box forming, embossing, tube and pipe forming.

71. Hydraulic Bending Press. Mechanical features of a new 20-ton hydraulic bending press are described in illustrated 4-page bulletin from Pines Engineering Co., Inc., 699 Walnut St., Aurora, Ill. Press handles pipe and tube sizes up to 2" o.d. x .083 wall.

**MILL IT *faster..*
SAVE LABOR!**



Kent-Owens advanced features mean speed, accuracy and dependability... in tool room or production milling. Rugged... simple in design and operation. Saves labor... reduces costs! Write for bulletins on wide range of hydraulic and hand-operated machines. Kent-Owens Machine Co., Toledo, Ohio.

No. 2-20 Milling Machine
Table, 42" x 12"
Table travel, 20"

KENT-OWENS
Milling Machines



Multiple Spindle Magazine Feed Power Screw Driving Machines

Latest type equipment for driving screws faster in products requiring two or more screws. These machines operate easily and require very little attention or adjustment once they are put in production.

Part Feeder

Automatic Part Feeders are adaptable to production jobs requiring the handling of small parts. Parts poured into hopper are arranged and fed down track in proper order. Send sample parts when writing for quotation.



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**ONE PIECE
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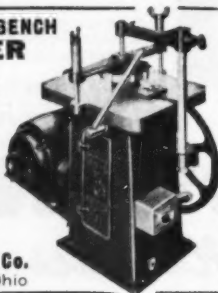
READING BENCH KEYSEATER

Portable — move directly to job; a time saver for both small and large shops.

3 3/4" stroke; adaptable for other work.

Low first cost—prompt delivery. Good dealers wanted.

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Natural or Colored
Fuller's Earth 10-44
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Write Dept. 3 for FREE Sample
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Continued from Page 321

a definite rate of production continuously.

Should it be necessary to shut down any station for adjustment or repairs, the unit can be controlled to operate in such a way as to by-pass the inoperative station. A stand-by conventional crankpin grinder can be used to grind the crankpin skipped by the automatic unit in this event. If the transfer equipment should fail, the individual grinding stations can be manned by operators and production resumed.

Use ACTION Card, opposite page 64. Encircle No. 48

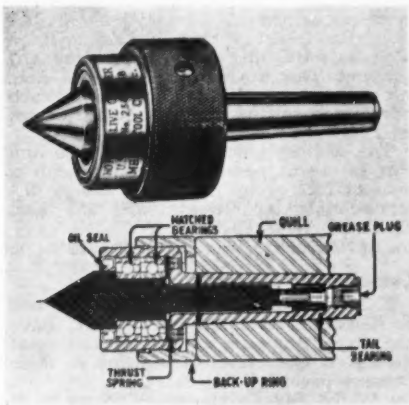
Howard live center

Howard live center features back-up ring that is said to assure positive rigidity. Ring backs up against face of the quill, transferring rigidity of the quill to the head of the center. Back-up ring reduces the spring in the body of the center at a ratio of four to one. This additional strength reduces the danger of the live center "following" the work and helps eliminate run out. For all practical purposes this live center has the rigidity of a dead center.

Matched ball bearings, mounted in tandem in the head and oil impregnated bronze bearing in the tail of the shank, permit greater thrust and radial loads at higher speed.

All models and sizes of the Howard live center have full length solid spindles. The Melin Tool Co., Dept. MB, 3374 West 140th St., Cleveland 11, Ohio.

Use ACTION Card, opposite page 64. Encircle No. 49



June, 1954

Only



have these exclusive* features

*Standard Full Ball Bearing Construction, including Spindles

Driving assembly is Full Ball Bearing mounted with 3 Bearings on each spindle. Thrust load carried by radial thrust bearings.



*Standard Slip-On and Slip-Off Template Construction.

For accurate setting and locating spindle brackets are machined to receive slip-on and slip-off template.



6 Standard Models . . . Models U-608 and U-1000—Ball Bearing. Models U-620B and U-1012B—Plain Bearing. 11/16" or 1/2" min. centers. Models U-608-B5 and U-1000-B5—Ball Bearing Gear Case, Plain Spindles.

Semi-Standard Heavy Duty Full Ball Bearing . . . 1/2" in Cast Iron—1-7/16" min. centers—7 1/8" or 9 3/4" dia.

1/2" in Steel—1-13/16" min. centers—7" or 9 5/8" Dia.

Also Larger Adaptations and Full Line of Fixed Center Drill Heads.

WRITE FOR FULL INFORMATION

Subsidiary of
Thomson Industries, Inc.



1030 N. PLUM STREET
LANCASTER, PENNA.

Also Makers of
DORMAN AUTOMATIC REVERSE TAPPERS

331

Hydraulic foot-controlled Milvise

A Milvise that can be mounted on machine or bench, and holds work with hydraulic pressure from a few pounds to five tons, has been announced by Studebaker Machine Co., Dept. B, 1221 S. 9th Ave., Maywood, Ill.

Hydraulic pressure is obtained by a foot-operator equipped with applicator pedal that moves rear jaw of vise forward to grip work; another pedal applies pressure to maximum and the third breaks pressure—jaw automatically moves back for release of work. Operator's hands are free to guide work and safety



is obtained through fully foot-controlled hydraulic system.

Construction of Milvise is steel. Jaw plates are hardened and ground steel. Jaw faces are aligned parallel to .001 inch accuracy. Cross slots and side cars are provided so Milvise can be bolted either lengthwise or across work table. V-ways and gibs assure straight line movement and square gripping between jaws. Hydraulic system parts are steel. Length 20 $\frac{3}{4}$ ", width 8 $\frac{3}{4}$ ", height 6". Jaws—width 6", depth throat 3", width opening between 5". Foot operator 18" x 9 $\frac{1}{2}$ " x 14". Use ACTION Card, opposite page 64. Encircle No. 50

Electric vibrating pen writes, marks, etches, engraves

The new Newage Actograp electric pen through its built-in electric magnetic vi-



brating system will engrave any marking on all metals, according to the manufacturer.

Through the magnetic vibrating system with a writing point at its terminal a continuous arc is produced which performs the engraving.

The marks can only be removed by grinding, filing or destroying the article. The hardness is immaterial as the penetration is sufficient to give the depth of marking required at the point of contact, leaving a clear line. Regular current is reduced through a transformer to 2 to 7 volts.

The Newage Actograp is light, small, handles like a pen. A patented screw adjustment at the tip enables the operator to scribe thick or thin lines at will, as well as adjusting the depth of the engraving. This device also serves to help adapt the pen to the hand and feel of each operator resulting in top efficiency from everyone who uses the tool.

The writing point has a long life and can be resharpened repeatedly with a smooth file, or by grinding. Newage International, Inc., Dept. MB, 235 East 42 Street, New York, N. Y.

Use ACTION Card, opposite page 64. Encircle No. 51

Commercial die set

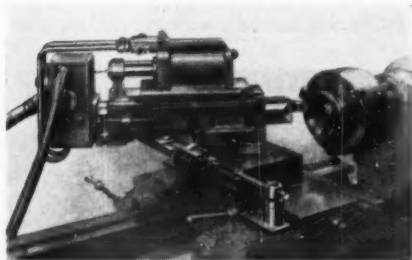
E. A. Baumbach Mfg. Co., Dept. B, 1812 S. Kilbourn Ave., Chicago 23, Ill., have announced they are adding a commercial die set to their line, in addition to their present precision die set line.

Use ACTION Card, opposite page 64. Encircle No. 52

Duplicating attachment

A new type of lathe duplicating attachment has recently been introduced which is said to cut machining costs as much as 70%. The Acc-U-Mat automatic, hydraulic lathe copying attachment has tracer follower accuracy of .0002" and a low tracer pressure of 3½ ounces, therefore permitting its use for close precision work.

The unit is easily mounted on any standard lathe and does not interfere with



normal operations when not in use. When as few as six identical pieces are to be produced, a template is made and the

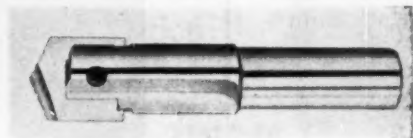
tracer follower guides the lathe cutting tool for inside and outside longitudinal turning of shoulders, chamfers, compound radii, thread runout grooves and other intricate shapes. Likewise, facing work is also done with this unit. Acc-U-Mat Machine Co., 40 Exchange Place, New York 5, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 53

Short-length spade drill holders for screw machine use

Especially designed for use on large automatic screw and chucking machines is a new line of spade drill holders with short over-all length and straight shank. In sizes ranging from 1¼" to 3½" in cutting diameter, they are drilled for coolant and have two threaded coupling holes, allowing a choice of coolant coupling connections.

These short-length holders are machined to use standard Waukesha spade



Looking for a WIDER SELECTION?

ACE has just what you are looking for—the finest Drill Bushings ever made! Now over 22,000 A. S. A. and other standard sizes plus specials. Also hexagon, knurled or serrated bushings

for use in soft or castable materials.
Always Specify Ace!

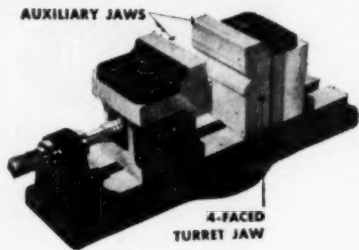


ACE DRILL BUSHING CO., INC.

5407 FOUNTAIN AVENUE
LOS ANGELES 29, CALIF.

SAVE SET-UP TIME

AUXILIARY JAWS



Brown Turret-Jaw Utility Vises cut production costs by eliminating time wasted on "rigging" set ups. It improves work quality because of rugged construction and ability to hold work tightly.

For complete specifications and prices write for Bulletin 23B, Brown Engineering Co., 126 N. 3rd Street, Reading, Pa.

BROWN UTILITY VISES

drill blades as are now used for deep hole drilling operations. They are also readily adapted to the use of special blades that combine drilling with facing, chamfering or counterboring.

Blades combining other operations with spade drilling are available on special order as are screw machine spade drill holders for cutting diameters smaller than 1 1/4" or larger than 3 1/2". Waukesha Tool Co., Dept. B, Waukesha, Wis.

Use ACTION Card, opposite page 64. Encircle No. 54

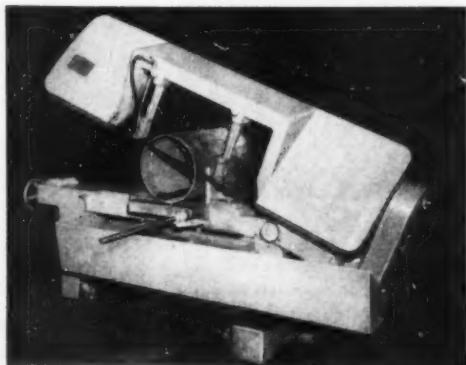
Advanced design air turbine milling, grinding hand tools

The new Newage Lorantco hand air turbine grinder and miller is said to be full of cost- and time-cutting features.

It comes in three sizes to perform grinding, milling and polishing operations at speeds to 85,000 r.p.m., 70,000 r.p.m., and 55,000 r.p.m.

High metal removal rate is another feature using high speed steel burrs with

MODEL 1220



KALAMAZOO

METAL CUTTING BAND SAW

big, rugged, built for heavier production

MODEL 8C

Cuts 8" round, 16" flat, 8" pipe.

MODEL 610

Cuts 6" round, 10" flat.

KALAMATIC AUTOMATIC BAR FEED ATTACHMENT for Kalamazoo Metal Cutting Band Saws.

Cuts 12" round, 20" flat stock. Accurate to thousandths of an inch, minimum burr and kerf. Four cutting speeds, four blade-tension adjustments for better sawing, longer blade life. Safety-designed throughout—only cutting section of saw blade is exposed. Positive power from heavy duty 1 HP motor. Available with coolant equipment.

Ask your dealer for details and demonstration.

MACHINE TOOL DIVISION

Kalamazoo TANK and SILO CO.

632 HARRISON ST., KALAMAZOO, MICHIGAN



coarse-pitch ground teeth for rotary filing and milling operations on metals such as aluminum and its alloys. When grind-

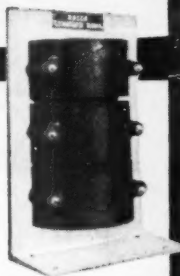
ing and lapping on tungsten carbide, diamond impregnated wheels are used. Spindle speeds can be varied quickly and endlessly over their complete range, advanced design, selected by a simple movement of a twist grip knob incorporated in the body.

The tools are designed for operation on air pressure from 60 to 100 lbs. psi. Special orders will be accepted for operation on pressure down to 30 lbs. psi. Newage International, Inc., Dept. B, 235 East 42 Street, New York, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 55

CUTLER HAMMER CO.

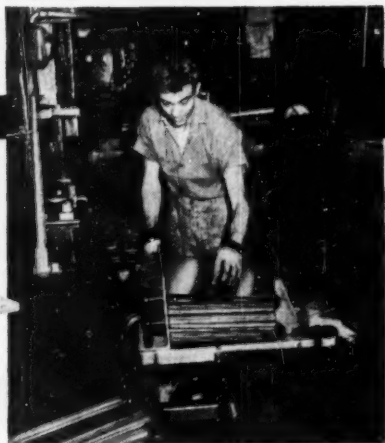
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If you work steel sheets or laminations, use a BASCO to automatically fan out the top sheets for quick, simple, safe handling.

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**Large Precision Machining
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. . . with full length bearing precision bushings, O.D. ground true to I.D. • We specialize in hole sizes #80 to 1/2", in any body size. Other sizes to your specifications. Production small hole drilling, our specialty.

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MICRO DRILL GUIDE

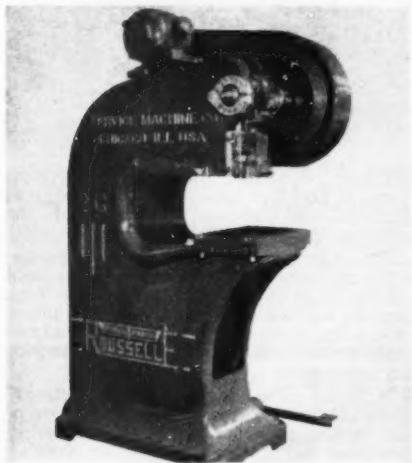
AND ENGINEERING COMPANY • Detroit 35, Mich.
P.O. Box 5184, Southfield Sta.

New 15-ton deep throat press

A new 15-ton Rousselle deep throat press, No. 2G, has been brought out by the Service Machine Co., Dept. B, 7629 South Ashland Ave., Chicago 20, Ill.

This press features an extra heavy one piece frame designed to withstand heavy duty loads. The throat is 18", which permits working to the center of 36" sheets making it suitable for sheet metal shops and preforming work on large pieces.

The bolster plate measures 11" x 16" and the shut die height is 7 $\frac{3}{4}$ " to the



bed. A standard 2" stroke makes it adaptable.

It is equipped with a single stroke or continuous clutch, roller bearing flywheel, large air-cooled brake and hinged motor mount; operates at 180 r.p.m. with a 1 h.p. 1750 motor. Weight complete 1875 lbs.

Use ACTION Card, opposite page 64. Encircle No. 56

M & N introduces new hydraulic system with subplate mounted controls

The M & N Hydraulic Press Co., Dept. MB, Clifton, N. J., announces the development of a new hobbing press that is said to utilize a simplified and improved hydraulic power system.

This new hydraulic system eliminates "in line" mounted hydraulic controls, and does away with unnecessary strain usually placed on lines by the weight of control valves. By eliminating a large

12" DRILLS 12" 12" LONG - 9" FLUTE HIGH SPEED STEEL

Size	Price	Size	Price
1/8	\$2.06	21/64	\$3.11
9/64	2.06	11/32	3.11
5/32	2.06	23/64	3.46
11/64	2.06	3/8	3.46
3/16	2.06	25/64	3.81
13/64	2.19	15/32	3.81
7/32	2.19	27/64	4.17
15/64	2.40	7/16	4.17
1/4	2.40	29/64	4.52
17/64	2.55	15/32	4.52
9/32	2.55	31/64	4.52
19/64	2.75	1/2	4.52
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PRECISION DIAMOND TOOLS

Industrial Diamonds
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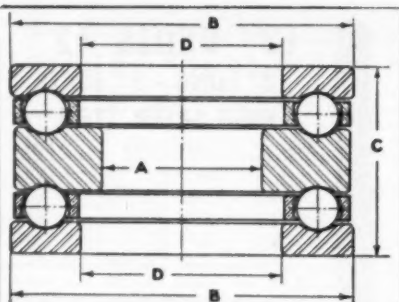
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WHEELS**
and Hones of
highest quality.
Prompt deliveries.

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DOUBLE THRUST, GROOVED, FLAT SEATED BEARING WITH RETAINER.
Can also be furnished with self-aligning washers.

ALL TYPES OF THRUST BEARINGS

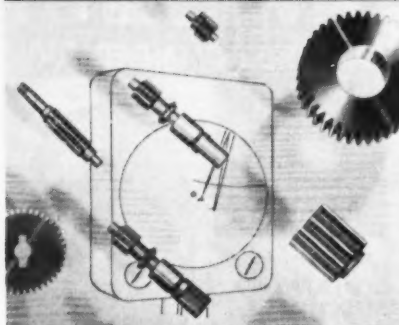
We can make them up to 25" outside diameter. We are geared to handle all of your thrust bearing needs.

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SEND YOUR PRINTS FOR QUOTATION

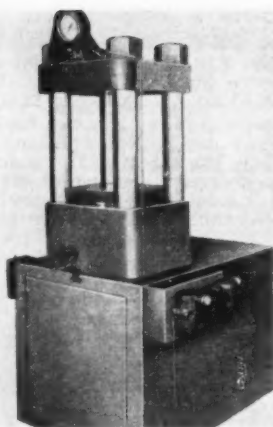


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number of joints, the M & N system reduces pressure losses through pipes and fittings, and eliminates many of the sources of possible leakage, it is claimed.

The subplate serves as a readily accessible mounting for all necessary control valves. Each valve is held in place by four screws, and sealed with reusable neoprene "O" rings. Valves mounted in this manner may be easily removed for maintenance or inspection.

With the valves mounted in close proximity the advantage of the system lies in the saving of space and piping, also in reducing loss of pressure in the lines.

Use ACTION Card, opposite page 64. Encircle No. 57

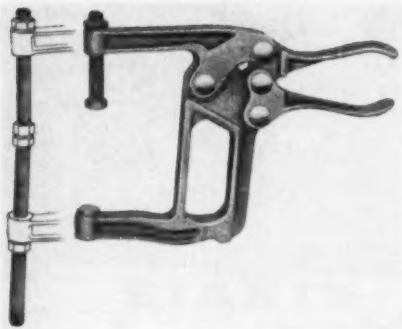
Three new clamp developments

Three new developments in clamps—spindle arrangement of clamping devices, air-operated clamps and a pull clamp—are announced by Lapeer Mfg. Co., Dept. B, Detroit 2, Mich. The first is offered as new double-spindle plier and C-clamp series.

Each model in the series has two spindles, one opposing the other, which can be retracted independently of each other to obtain the desired clamping opening anywhere within the throat gap.

The pliers are identified as Model P-1200-2S Series, and the C-clamps as Model C-1200-2S Series. In both of these series the clamping force is 1200 lbs. Also presented for the first time is the double spindle plier Model P-1800-2S which has a clamping force of 1800 lbs.

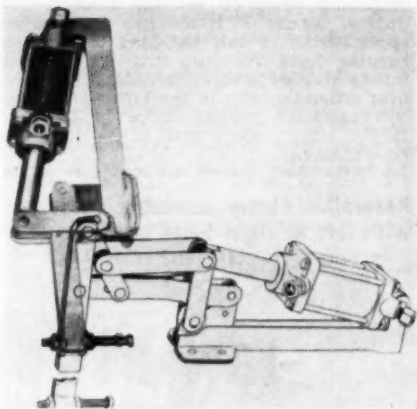
The air-operated clamps, having toggle



action which has the unique ability of "going around a corner" to do its clamping, is now added to the line of Knu-Vise air clamps.

This clamp series was designed to meet situations where space in the horizontal plane is too limited to accommodate a conventional model air clamp, thus preventing the free operation of the air cylinder in the same plane.

This clamp design provides the answer



to such a problem. The clamp can be mounted in a vertical position, alongside the work, but at a lower level, and allows the double-toggle action arm to swing in a 45° arc "around the corner" right over the work to make spindle contact.

The new pull clamp with a hook was



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Model A...1" (max. capacity 1-1/16")
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Round, square or hexagon collets, plain or serrated
No. 3 Collet Pads Now Available

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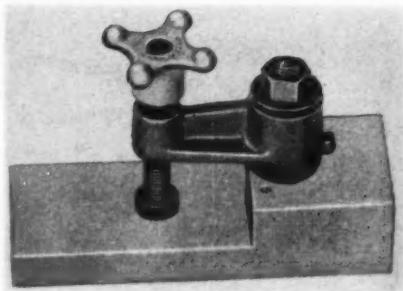
HALL MANUFACTURING COMPANY
622 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

originally designed for the aircraft industry. Model PCH-100 has two major applications. It can be used to pull in regular hook fashion; that is, inserted into a ring of a strap or simply hooked over an angle iron. In the former use, the recommended pulling force is 100 lbs. In the latter case a pull of 200 lbs. can be utilized.

Use ACTION Card, opposite page 64. Encircle No. 58

Reversible clamp assembly operates with left or right hand swing

Jergens Tool Specialty Co., Dept. B, 712 East 163rd St., Cleveland, Ohio, has



18% BIGGER BARREL



Gives Faster, Easier, More Accurate Measurements

There's more space between graduations making it easier to estimate fractions of thousandths. There are longer graduation lines and the rapid reading figures marking each thousandth are larger. Non-glare Chrome-Clad satin finish on the

barrel gives you easy reading even in poor light. Lufkin micrometers are easiest to adjust, too — the reading line keeps its original position directly in line of vision and the thimble doesn't cover measurements on the hub.



New **LUFKIN** Big Barrel Micrometers

A Complete New Line To Exactly Fit Your Needs

In the new Lufkin Big Barrel Micrometers you have a choice of Friction Thimble, Ratchet Cap or Direct Feel only. You can have the exclusive new Lufkin Slip-Proof black crackle finish on the frame or Chrome-Clad satin finish. You can have any style with or without lock-nut. You can have carbide tipped anvil and spindle. The new Lufkin shorter design gives you better balance and the extended anvil and tapered frame permit you to take measurements in places inaccessible to other micrometers. You'll like the new Lufkin Big Barrel Micrometers — try the one of your choice today.

BUY **LUFKIN** TAPES • RULES • PRECISION TOOLS
FROM YOUR DISTRIBUTOR

313 THE LUFKIN RULE CO., • SAGINAW, MICHIGAN
132-138 Lafayette St., New York City • Barrie Ont.

announced an addition to its line of standard jig and fixture components of a new reversible clamp assembly for use in holding down work to be drilled or milled.

According to the manufacturer this new reversible clamp assembly is designed to operate with either left or right hand swing by optional location of stock to be drilled or milled. It is made of malleable casting tumbled smooth and is designed to quickly swing clear of work and fixture. Made in three sizes, the new clamp

assembly can be simply applied by drilling and tapping one hole.

Use ACTION Card, opposite page 64. Encircle No. 59

Clutch operated turret indexing

Dwell times ranging from .835 seconds to infinity are possible with the new clutch-operated series of turret indexing units, according to Swanson Tool and Machine Products, Inc., Dept. B, Erie, Pa.

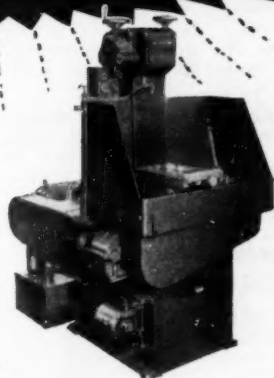
Developed to supplement the range of applications served by Swanson direct-

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THE RUTHMAN MACHINERY CO.

1816 READING ROAD

CINCINNATI, OHIO



drive turret indexing units, the new clutch-operated models are available with 8, 16, 24 or 32 work stations and 20", 30" or 40" turret diameters. Maximum indexes per hour range up to 2154.

The solenoid operated clutch drive is said to be especially suited to applications which require a variable or infinite work cycle, or where it is desirable to have the operator determine the indexing cycle by means of push button controls.

Where drilling cycles and other similar operational procedures require automatic control, limit switches may be used to prevent indexing before any given operation is completed.

Use ACTION Card, opposite page 64. Encircle No. 60

Heavy duty pneumatic stud stamping machine

Development of a new pneumatic stud stamping machine with exceptional die space has been announced by Geo. T. Schmidt, Inc., Dept. MB, 1802 Belle Plaine Ave., Chicago 13, Ill.

Known as their Model 25ES-S, this machine is primarily designed for stamping ends of studs and shafts up to 20" long. The unit is quickly adapted to change for various lengths, since accurate table settings are not required. Any setting within $\frac{3}{8}$ " of the piece part is sufficient to insure clean, sharp, uniform stamping, the manufacturer claims.

A hand wheel allows $4\frac{1}{2}$ " vertical table



adjustment and greater adjustments are easily made by resetting the table on the sliding backplate. The backplate steps are spaced at 3" intervals and table is designed to be reversible, thus providing maximum die space.

A unique feature of this machine is a pneumatic cushion which will permit the marking of parts varying in thickness or length up to $\frac{3}{16}$ " at the same table setting and with uniform depth of impression. Operator merely inserts part and steps on foot pedal. A 4-way valve provides for the fast return of the table to the loading position. Impression depth is controlled by a convenient direct-reading hand valve. The machine operates off the shop air line at pressures varying from 25 to 100 lbs.

Parts of shorter lengths can also be stamped on this machine by reversing the table in order to obtain the minimum die space.

The machine's marking capacity in tool steel is rated at forty-five $\frac{1}{16}$ " characters, thirty $\frac{3}{32}$ " characters, twenty $\frac{1}{8}$ " characters and fifteen $\frac{5}{32}$ " characters. Head is bored to take 1" dia. shank stamping dies.

Production is said to be 700 to 900 parts per hour, depending upon the shape and size of part to be stamped, length of lettering and size of characters.

Use ACTION Card, opposite page 64. Encircle No. 102

Laminated aluminum shim stock

Laminated Shim Co., Dept. MB, Glenbrook, Conn., has announced shim stock of laminated aluminum in which the laminations are bonded over the entire surface. They are said to peel for adjustment in exactly the same way as the brass and steel shims this company has been producing for over 41 years.

This laminated shim material makes available all the advantages of aluminum—light weight, freedom from corrosion and electrolytic action—in shims that look "solid" yet peel quickly and smoothly for adjustment.

Laminated aluminum shims are avail-



able either custom-stamped to blueprint specifications or as laminated sheet stock in thicknesses from .015" to .125", sizes to 20" x 48".

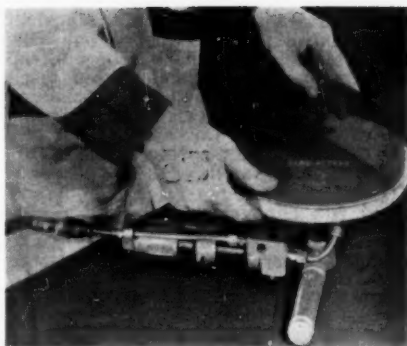
Use ACTION Card, opposite page 64. Encircle No. 103

Open mesh "sandpaper" non-clogging

Sand Screen, Carborundum's new non-clogging open-mesh abrasive material, designed especially for sanding operations where loading or glazing is a problem, is now in full production and is commercially available in a wide variety of shapes and sizes.

Sand Screen is said to give 7 to 15 times longer life than conventional coated abrasives.

The new sanding, screen-like abrasive is coated uniformly on both sides, with silicon carbide grain. Its unique, open-mesh construction reduces loading to a minimum, by permitting sanding residue to flow freely through the numerous openings, and also enables the material to be used on both sides. Through a recent development in the manufacturing process, it is now possible to retain the sharpness of the abrasive grain on both sides.



Sand Screen can be used wet or dry, for both machine and hand sanding operations. It comes in full sheets, cut sheets and discs, in grit sizes of 180 and finer. It can also be furnished in standard 50-yard rolls up to 18" wide.

The new material can be used flat or can be folded to any desired size for hand sanding. It can also be creased and torn readily into any desired width from a 9 x 11 in. sheet.

In machine sanding, excellent results

NIELSEN

Heavy Duty

Live Centers

Write for catalog on live centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

NIELSEN, INC. LAWTON, MICH.

The New "UTILITY"



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Nine sizes of type stamped with the same holder—furnished in sturdy wooden box—for all interchangeable marking.

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Meeco
SAFETY
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M.E.CUNNINGHAM CO.

1048 Chateau Street • Pittsburgh 33, Pa.

are claimed with Carborundum's Fastcut and Flexbac pads. An application now under test involves the use of built-up wheels, made from Sand Screen discs, for light deburring and other polishing operations generally performed with set-up wheels. Sales Literature Dept. BB, The Carborundum Co., Niagara Falls, N.Y. Use ACTION Card, opposite page 64. Encircle No. 61

Ideal tap connector

A new tap connector said to make stronger, lower cost street taps, service

drops, dead-end loops, T-taps, transformer and machine tool connections and ground connections has been announced by Ideal Industries, Inc., 210 Park Ave., Sycamore, Ill.

Among the advantages claimed for the new connector are greater holding pressure—up to $1\frac{1}{2}$ times that of other types. It is provided by a hex set screw which can be tightened with a wrench. An extra large pad and stirrup distribute the pressure over the entire connection area, reducing deformation of the wire and mak-

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Whether you're retooling or replacing component parts you can assure yourself against costly downtime by using SEIBERT precision parts. Experience plus quality control production has established SEIBERT as the leader with machine tool and drill head manufacturers. Remember too, SEIBERT mass production techniques mean lower prices. Ask for our quotations.

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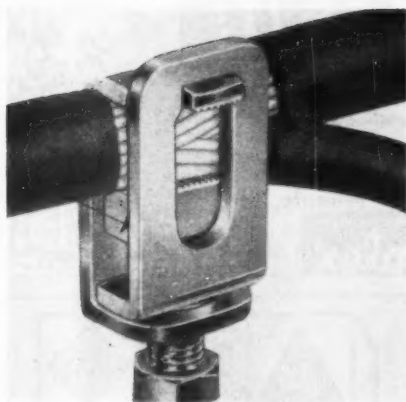
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MULTIPLE SPINDLE DRILLING EQUIPMENT

SEIBERT & SONS INC.
CHENOA, ILLINOIS





ing a low-resistance connection. This combination of holding pressure, contact area and high mechanical strength of the unit eliminates chances for wires to work loose with resulting poor contacts and possible "burn-outs." As a positive check on the connection, the electrician can see the joint through the sides of the connector as it is being made.

Because of the wide capacity range of each size, the connector is an all-in-one unit.

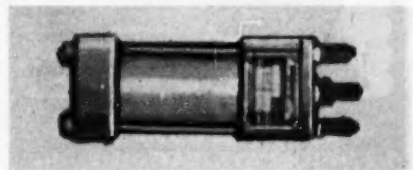
Use ACTION Card, opposite page 64. Encircle No. 62

Miller motor offers "stock" cylinders

Miller Motor Co., Dept. BB, 2026 N. Hawthorne Ave., Melrose Park, Ill., is offering "stock" cylinders for immediate delivery in several hundred popular combinations of bore, stroke and mounting.

These cylinders have solid steel heads, caps and mountings, hard chrome plated piston rods, dirt wiper seals, leakproof piston and rod seals that never require adjustment and are otherwise identical in design, construction and workmanship to the company's custom-built line.

Use ACTION Card, opposite page 64. Encircle No. 63





CONCENTRIC the original, LIVE CENTERS patented spring loaded live center

Operates 4 to 5 times faster than ordinary live centers.

Spring loaded spindle gives automatic tail stock adjustment.

GREATER LOAD CAPACITY

LONGER LIFE

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CONCENTRIC TOOL CORP 2486 Huntington Drive, San Marino, Calif

FASTER SPEEDS

AUTOMATIC THRUST ADJUSTMENT

**LESS OVERHANG
MEANS MORE
RIGIDITY. MORE
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RANGE**



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LET'S FACE IT!

★ A Boring head that won't face is not complete
Boring, Facing, Turning, Grooving, Undercutting—
All in ONE Toolhead

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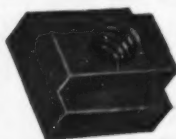
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Chandler Duplex

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CAM MILLING

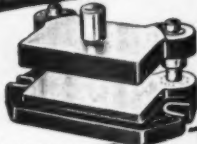
Fully equipped modern machine
shop with extensive Jig Boring,
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23-22 44th Road Long Island City 1, N. Y.

DANNEMAN Precision DIE-SETS

Precision-Bored
on Master Plates



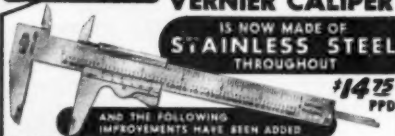
DANNEMAN DIE-SET DIVISION
ACME-DANNEMAN COMPANY, Inc.
201 Lafayette St. New York 12, N. Y.

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The Genuine MAUSER
VERNIER CALIPER

IS NOW MADE OF
STAINLESS STEEL
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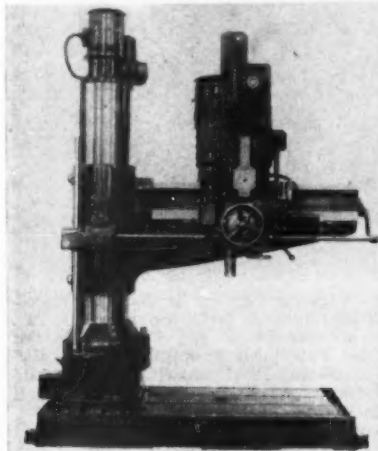
AND THE FOLLOWING
IMPROVEMENTS HAVE BEEN ADDED:
• SPECIALLY LONG VERNIER to read thousandths
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• 3 GRADUATIONS - 1/1000" - 1/128" - 1/16 mm in inch
Request illustrated folder showing complete line of
MAUSER Toolmakers Calipers, Height Gages, Bore Pro-
tractors and Tool Stands.

GEO. SCHERR CO., Inc. 200-MT Lafayette St., N.Y. 12

Radial drilling machine has 36 speeds

British Industries Corp. announces a new Model E27A Kitchen & Wade radial drilling machine having 36 spindle speeds and nine rates of power feed. Speeds are from $8\frac{1}{2}$ to 800 rpm.

The saddle contains centralized controls with all speeds and feed change gears under operator's immediate control. The machine is ball bearing; nickel chrome change gears run in oil bath; ball bearing rollers for racking; reverse at any speed;



automatic trip for depth drill covers full feed traverse at one setting; single lever switch controlling both motors to automatic starter; finger tip traverse of head on arm.

This machine has a 15" column; weighs $6\frac{1}{2}$ tons. British Industries Corp., Dept. MB, 164 Duane St., New York 13, N.Y. Use ACTION Card, opposite page 64. Encircle No. 64

New Impco ram-type vertical mill

A new vertical mill, the Model 1-B, which is said to be practical for both production and tool room milling, is now in production by Industrial Metal Products Corp., 3407 W. St. Joseph St., Lansing, Mich.

A unique feature of the mill is that unlike knee-type mills, the Impco head is vertically adjusted by a counter-balanced ram, for greater accuracy and rigidity. The table and the easy-to-reach centralized controls always remain the same height from the floor. The 1-B weighs approximately 3,100 lbs.

For ample range and versatility the

MEET THE CHAMP! UNIVERSAL DRILL BUSHINGS



**BEAT ALL
RECORDS
FOR
LONG
LIFE
AND
ACCURACY**

**UNIVERSAL
ENGINEERING
COMPANY**

179-B

FRANKENMUTH 10, MICHIGAN

Now... a quality JIG BORER

that
every shop
can afford



The SIMA Jig Borer features an unusually large 32"x20" hand scraped table with 20" longitudinal and 15" cross travel. Designed by American shop men and solidly built by European craftsmen to combine accuracy, easy maintenance, versatility and medium price.

Created to small shop specs, the SIMA also handles large capacity work to a guaranteed accuracy of .0006" in 20". 16 spindle speeds; 35-1500 rpm. Spindle design facilitates use of standard tooling. Reasonably prompt delivery on this rigid well constructed SIMA Jig Borer.

Write today for full details

AMITool COMPANY
629 MAIN STREET

WESTBURY, L. I., N. Y.

WESTBURY 7-3400

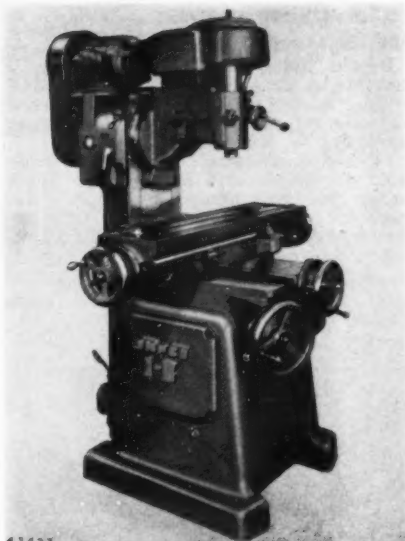


table working surface is 10"x40", maximum longitudinal table movement is 24", cross movement is 12". The range of opening from table to spindle nose is 4 1/8" minimum to 18 1/4" maximum. Spindle quill diameter is 3 1/2" with 5" travel. Speed range is 75 to 3,000 r.p.m.

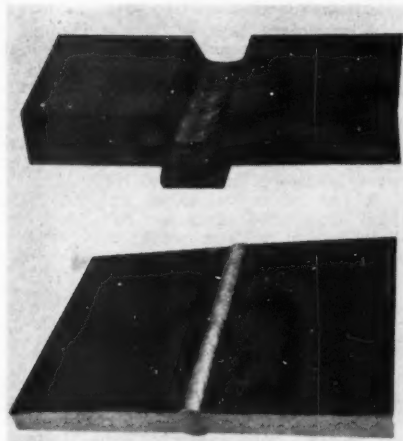
Use ACTION Card, opposite page 64. Encircle No. 65

New Jetweld 2

The Lincoln Electric Co., Dept. B, Cleveland 17, Ohio, has announced the second electrode in its newly developed line of electrodes with powdered metal in their coatings. Called Jetweld 2, the new electrode is designed especially for welding butt and deep groove joints. It is a companion electrode to Jetweld 1, designed for welding horizontal and flat fillet joints.

These new electrodes with powdered metal in their coatings are claimed to be a radical departure from electrode designs that have been the standard for the past twenty years. Jetweld 2 is designed for high speed welding of butt and deep groove joints.

Certain operating difficulties inherent in all conventional electrodes are overcome by powdered metal coatings to give new standards of performance. First, an additional source of metal is available to permit higher deposition rates at usable currents and, second, the problems created by the excessive amount of heat in

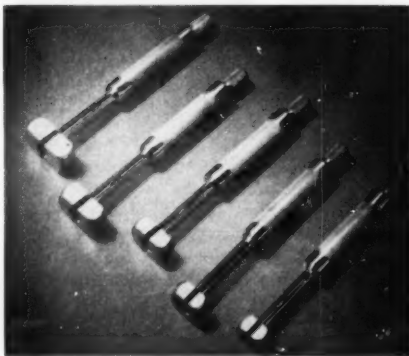


the arc are eliminated. Powdered metal in the coating is the additional source of metal, and the excess heat available in the arc is used to melt this metal. Faster speeds are therefore possible without too much penetration, gouging of the parent metal, undercutting, spatter, overheating of the electrode coating or other difficulties associated with high current production welding and which limit the speed of welding. It is available in 5/32", 3/16", 7/32" and 1/4" diameters.

Use ACTION Card, opposite page 64. Encircle No. 66

Inside adjustable gages available in range of sizes

A complete line of inside adjustable gages ranging in size from 3/8" to 2", with



June, 1954

WHEN YOU WANT WASHERS

Save by buying from

WHITEHEAD



by using Whitehead Stock
Washer Dies.

1500 SPECIAL SIZE DIES
ON HAND.

Whitehead makes washers and shims from any metal or special material to your specifications. Thickness from .002" to 3/8".

In stock: S.A.E. standard light, medium, and heavy steel washers; brass and copper, small and large patterns; bolt sizes. Write for Whitehead's Catalog.

54-4



**WHITEHEAD
STAMPING CO.**

1671 W. Lafayette Blvd.
Detroit 16, Michigan

349

special sizes available on order, has been put on the market by the Barnaby Mfg. Co., Dept. B, 74 Knowlton St., Bridgeport, Conn.

Features are: Useful for inspection of inside diameters, for checking bell-mouth and out-of-roundness; can be held securely to micrometer limits regardless of hand pressure or tolerance; gages have a solid piece collet steel head which is hardened and ground; each gage is hard chrome plated; anvils hardened; sizes under one inch are differentiated by gaging increments of .100"; sizes from 1" to 2" are differentiated by gaging increments of .250".

Use ACTION Card, opposite page 64. Encircle No. 67

Wespo toggle clamps

A complete line of toggle clamps in over 35 sizes is announced by the West Point Mfg. Co., Dept. B, 26935 W. 7 Mile Rd., Detroit 19, Mich., claiming hardened steel bushings and pins reduce the wear at bearing points, giving longer life as well as easier, faster action. They are made for light, medium and heavy pressure loads—80 lbs. to 1600 lbs.

A line of swivel shoes and screws is also announced; they are said to be effective for holding workpieces without marring or moving. They come in four types and 63 sizes.

Use ACTION Card, opposite page 64. Encircle No. 68



and
many other small parts
are handled automatically

with ***SYNTRON***

PARTS FEEDERS

Feeding small parts of almost every shape and material—at controllable rates—single file—in oriented position—Syntron Parts Feeders provide the most efficient and economical method yet developed for full production feeding of parts in automatic processing set-ups. Electromagnetic operation—no mechanical wearing parts—easy to install.

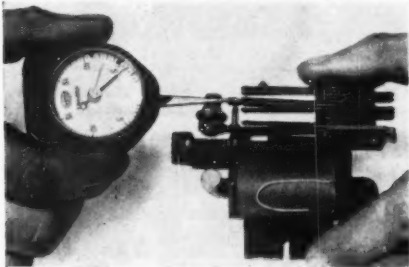
Write for **FREE**
Catalogue Data

SYNTRON COMPANY
300 Lexington Ave. Homer City, Pa.

Dynamometer for delicate mechanisms

The George Scherr Co. announces a new precision dynamometer for measuring spring tension, starting torque and the force required to actuate delicate mechanisms.

Applications are found in fields of industry where uniformity of pressure,



starting torque or spring tension are necessary to insure proper functioning.

The instrument is available in two models, small and large, each in several ranges in grams of pressure, acting in both directions. Small number in ranges 5-15, 5-30, 10-50, 20-100, 25-150 grams. Large model 25-250, 50-100, 100-1000 grams. George Scherr Co., 200 MTD Lafayette Street, New York 12, N.Y.

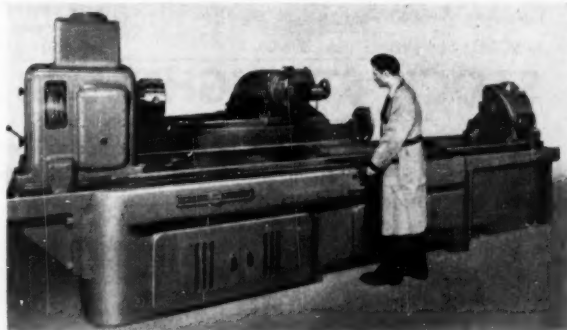
Use ACTION Card, opposite page 64. Encircle No. 140

Horizontal gear shaver for spur and helical gears with shafts up to 142" long

A new Red Ring Model GCJ-36 horizontal gear shaving machine that will finish teeth on spur and helical gears up to 36" pitch diameter having shafts up to 142" long is announced by National Broach & Machine Co., Dept. B, 5600 St. Jean Ave., Detroit 13, Mich.

The machine is equipped with a power driven headstock and a center tailstock, each mounted on base extensions and traversed by rack and pinions for positioning. Gears up to 2 diametral pitch having face widths up to 36" can be finished on the new shaver. Crowning of tooth surfaces on spur and helical gears up to 12" wide having shafts up to 62" long can also be performed on the machine.

Gear and shaft assemblies can be mounted in the machine on the shaft



Hammond
WET or DRY
CARBIDE TOOL GRINDERS



HAMMOND Carbide Tool Grinders will soon pay for themselves through greater wheel economy, longer tool life and faster grinding.

Model WD-10 Wet or Dry 10" Carbide Tool Grinder.

6", 10", 14" Wet or Dry - Chip Breaker Grinders - Diamond and Abrasive Belt Finishers. WRITE FOR CATALOG 225

Hammond Machinery Builders

1614 DOUGLAS AVE. KALAMAZOO, MICH.

centers, or the machine can be equipped with a flexible type work driver which enables gear and shaft assemblies to be shaved while rotating on the journals on which they will run in the equipment drive.

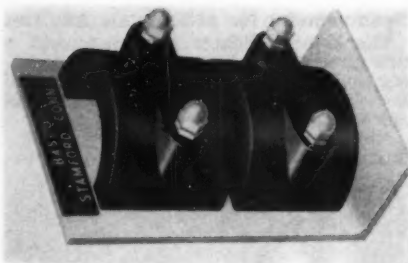
Gear tooth surfaces are finished on the new model by the crossed axes principle. The gear is rotated while in mesh and

drives the gear shaving cutter which is set at crossed axes to the gear center-line. The serrated-tooth cutter is traversed back and forth across the gear tooth face while being fed in selective increments to a depth that will produce the desired tooth size. Nine and 12-in. diameter cutters are used.

Use ACTION Card, opposite page 64. Encircle No. 69

Basco has midget separator for light metal sheets

Basco Mfg. Co., Dept. B, 5 Woodside St., Stamford, Conn., has added a midget



THE "MIGHTY MIDGET" LINE

Get a better "SURFACE GRINDER" job at less cost

ORDER DIRECT on our 10 day money back guarantee

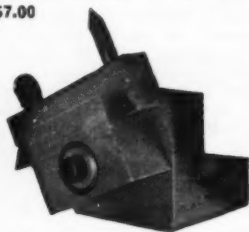
RADIUS DRESSER \$39.00

Diamond \$7.00



ANGLE DRESSER \$44.00

Diamond \$7.00



Hardened shaft—bearing adjustable for wear. Diamond always perfectly centered. Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON Grinders—\$44.00. Diamond \$7.00.

SPECIAL 14" Wheel Size \$95.00.

Ball Thrust Bearing. 24

Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.

STOCK STRAIGHTENER —2" Size

For coiled material

ORDER DIRECT on our 10 day money back guarantee

The ONLY low cost stock straightener with all **\$22500** these features:

1. Built in stock oiler.
2. Hardened and ground rollers with positive adjustment lock.
3. All lower rollers gear driven, this cuts feeding pressure.
4. Front and Rear Ball Bearing Guide Rollers.
5. All bearings either ball, needle or oil impregnated bronze.
6. Straightens steel up to 2" wide by .048 thick, brass and aluminum thicker.
7. Material can be pulled through straightener by your Roll or heavy Hitch Feed, or motor. Supplied with easily removable crank for hand feeding.



(Shown with gear-cover removed)

SPERMAN METAL SPEC.

**2197 EAST 21ST STREET
BROOKLYN 29, NEW YORK**

separator to its successful line, the No. 50 series, designed for use by manufacturers using light metal sheets.

Pictured here is the No. 52 separator, an adaptable unit standing 5" high, 3¼" wide, with the base of the mounting plate extending back 1¾". It is a two-magnet separator, each magnet being only 2½" wide and 1½" deep. This unit is suited for use on feeders of tin lithographing machines as it raises the metal just high enough to permit room for the grippers to catch hold of the sheet and carry it into the press. Used in this manner the

unit does away with the need for using pointed tools which, in raising the sheets, often scratch the base colors and finish. The No. 50 series is made in 1, 2 and 3 magnet sizes to fit specific needs.

Use ACTION Card, opposite page 64. Encircle No. 70

Dial indicators repaired

Inspection Devices Co., Dept. B, 5636 S. Lake Park Ave., Chicago 37, Ill., announce that they have recently inaugurated a new service—the repair, within 48 hours, of all makes of dial indicators, plug gages, etc.

Use ACTION Card, opposite page 64. Encircle No. 71

A "MUST" FOR CLOSE TOLERANCES

INDIA® & HARD ARKANSAS® OILSTONE FILES

No matter how intricate the part... how close the tolerance... how tough the surface... these outstanding INDIA Oilstone Files will do the job quickly, accurately and with greater ease. A selection of 35 shapes and 97 sizes to choose from. For superfine finishes ask your distributor for HARD ARKANSAS.

GET THIS NEW CATALOG

It contains a complete description of the entire BEHR-MANNING® Oilstone line. Write BEHR-MANNING, Troy, N. Y., for your free copy. Address Dept. BB-6.



O-4

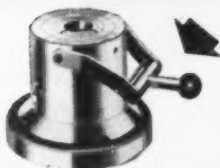


- ▲ COATED ABRASIVES
- ▲ SHARPENING STONES
- ▲ PRESSURE SENSITIVE TAPE

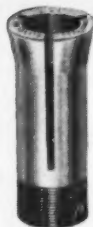
Always
on the
alert!



now, bigger and
better handles on
Zagar FIXTURES



Zagar 2" holding fixture.



Zagar 5-C
pull type
collet.



Zagar 1" indexing fixture.

Not in itself a radical change, but illustrating an old, steady determination to keep on improving every Zagar product whenever possible. All the well known advantages of Zagar design: rigid holding, accurate construction, quality finish, and the dependability that goes with Zagar's 15-year-old standards. Also a complete line of air-operated holding fixtures and collet lathe chucks.

Write for new Bulletin "B-6".

**ZAGAR TOOL, Inc., 24000 Lakeland
Blvd.
Cleveland 23, O.**

Zagar **TOOLS For**
INDUSTRY
and SPECIAL MACHINERY

New model Electropunch

Black & Webster, Inc., Dept. B, 445 Watertown St., Newton 58, Mass., announce the introduction of a new Electropunch to their line of solenoid-operated production tools, the Model F.

It has open-back, C-frame construction which permits easy use with hopper or automatic feed. The solenoid and ram are fixed as to height above the base. It delivers uniform impacts, adjustable from a few ounces to 3500 lbs. at rates up to 125 blows a minute, and can be operated from any 115 v. ac outlet. It is said to be



especially suitable for staking, marking, swaging, punching and other high-speed production operations.

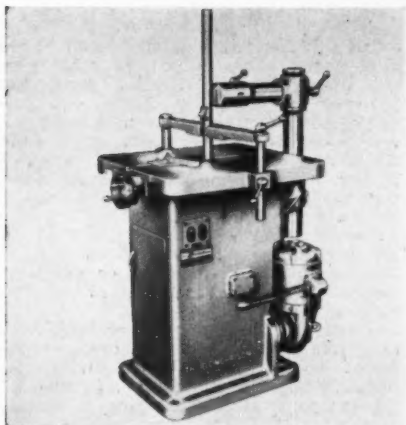
Hand, foot or automatic switching can be used, with two impact ratings: 2000 lbs. (Model FH), 3500 lbs. (Model FS). The unit is 20" high, weighs 50 lbs. and has a base 9½" x 9". Throat depth is 5"; shut height 3¼".

Use ACTION Card, opposite page 64. Encircle No. 72

Keyseater featuring automatic feed, centering and relief

The Morrison keyseater is said to cut keyways from 1/16" to 1" with maximum length of cut of 8½". The largest diameter cutter bar is 1¼" and distance from 1" cutter to column is 16¼".

Automatic feed is provided to insure accuracy. Automatic relief backs the work



away from the cutter on the up stroke, eliminating drag. Automatic centering locates the work quickly and can be set for multiple jobs of two or more pieces, automatically centering the next work-piece.

Additional features include automatic

stop to cut off the feed for any given depth; one shot lubrication system; single tooth cutters for accuracy and eliminating time and trouble in sharpening; quick setup with all control handles built into the machine.

Different cutter bits are interchangeable and in most cases the cutter bar does not need to be changed in order to cut different size keyseats. The machine uses no bushings and this feature not only simplifies the operation, but no extra equipment need be ordered to cut a keyseat in any size bore. The motor drive and electrical equipment are all built into the machine and include a 1½ h.p. geared motor, magnetic switch and start-stop-jog push button stations. The D. C. Morrison Co., Box 1017-C, Cincinnati, Ohio.

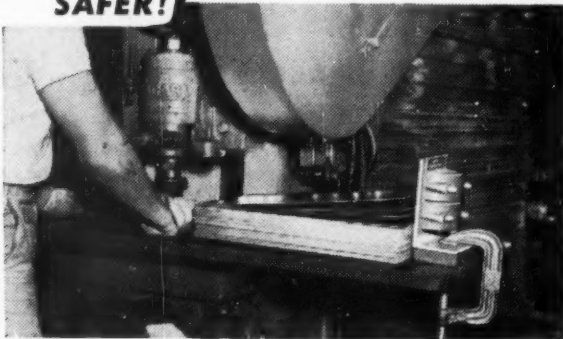
Use ACTION Card, opposite page 64. Encircle No. 73

Taps produce self-locking internal threads

An Ever-Lock Shearcutter tap which is claimed to produce self-locking internal threads, without the use of bolts, nuts, lock nuts, cotter pins, locking wires, etc., yet give locking torques in excess of normal requirements in industry, has been introduced by the Fearless Ever-

**FASTER!
SURER!
SAFER!**

SEPARATIONS OF SHEET STEEL
AND LAMINATIONS.



G. S. BLODGETT CO., Inc., Burlington Vt., manufacturers of baking and roasting ovens say "... many of our steel parts in fabrication are being handled more economically and with greater ease. We consider our BASCOS a good investment."

SHIPPED ON APPROVAL

... if not completely satisfied, return to us — NO EXPLANATION NECESSARY.

Send for the New
Basco Catalog

Distributor Inquiries
Invited.



Manufacturing Co.
13 Woodside St.
Stamford, Conn.



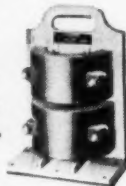
BASCO SEPARATORS

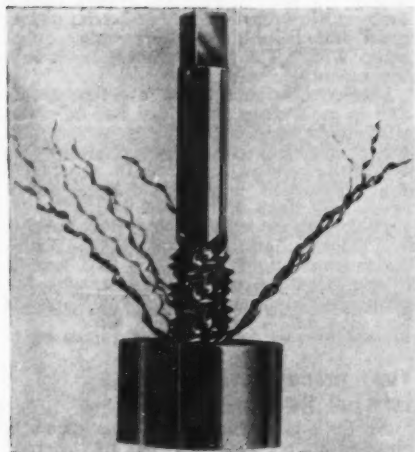
BASCO SEPARATORS reduce cost of handling, increase production, lessen injuries, save gloves, stop double feeding, lift polished or painted parts without scratching. SEPARATES GREASY, ROUND, SQUARE NESTED OR ODD SHAPES

Permanence of
Magnetism Guaranteed

FIVE STANDARD MODELS

to simplify
handling of
sheet steel up
to ¼" plate,
stock width to
48", stock
heights to
10½"





Lock Tap Co., Dept. MB, 7045 Darby Ave., Reseda, Calif.

Manufactured to close tolerances, they are produced in Class PG-II tap classes only, but are made to produce three classes of fits, namely: snug, tight, and

extra tight. Standard go and no-go thread plug gages, Class III fit, may be used for inspection. No special gages are required.

Originally conceived for high temperature applications in turbo-jet engines where the loosening of a bolt, capscrew or nut might cause fatal results, these new taps are said to result in savings in production costs.

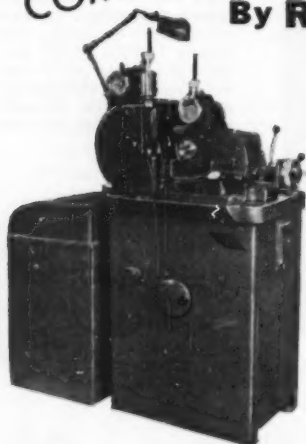
Standard cap screws may be used for the fastening of parts together and no lock washers, wires or other auxiliary devices are needed to maintain the self-locking action.

Only one class of screws or bolts need be purchased. Many labor operations may be eliminated, for a bolt with its nut requires the use of two hands, one for turning and one for holding a wrench to prevent the nut from turning. With the self-locking threads produced by the Ever-Lock tap, standard cap screws either of the hexagonal, square or socket head type may be substituted for a bolt and the screw can be tightened to the proper degree for locking and holding by a power driven or hand operated torque wrench, insuring uniform locking and holding tension.

Use ACTION Card, opposite page 64. Encircle No. 74

A COMPACT CENTERLESS GRINDER

By ROYAL MASTER (24"x48" floor space)



For **THRUFEED,**
PLUNGE,
and INFEED } **GRINDING**

Designed to grind small diameter forms which might call for plunge or infeed grinding—as well as long rods of small diameter.

Grinds anything from plastics to tungsten carbide; tolerances as low as .0002 inch can be consistently held, and 6 to 8 micro finishes are easily obtained. Will handle practically any shape up to 1" diameter, and many shapes up to 1½" diameter. Occupies 24"x48" floor space, including coolant tank.

Write TODAY for new literature with complete details and prices on this and other models.

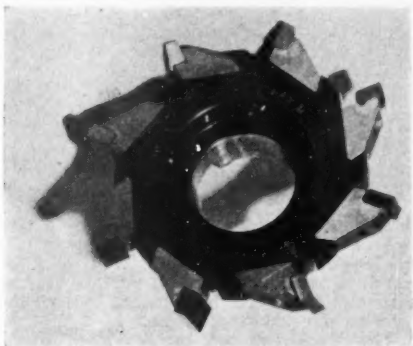
ROYAL MASTER, INC.

200 STATE HIGHWAY NO. 23

RIVERDALE, NEW JERSEY

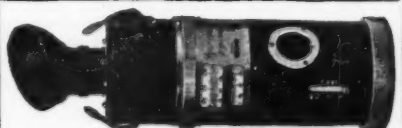
Millit introduces shell and face mills

Shell end mills from 4" to 8" and face mills from 8" to 14" in dia. are now available with the patented Millit replaceable blade. The Millit blade design features maximum tooth back-up that makes possible a replaceable blade cutter with the same full tooth rigidity characteristics as solid body brazed on tip shell mills and face mills. Rake angles of the new cutters are built into the blade rather than determined by the body slot as in conventional inserted blade shell mills and face mills. This enables the user to reblade any size



cutter body for all types of cutting service such as converting from cutting aluminum to steel, all with proper rake angles. Blades are also available with a choice of carbide, h.s.s. or cast alloy cutting tips. This enables the user to convert a carbide face mill into a high speed steel face mill by a simple change of blades. Millit, Inc., 35 Flint Street, Rochester 8, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 75



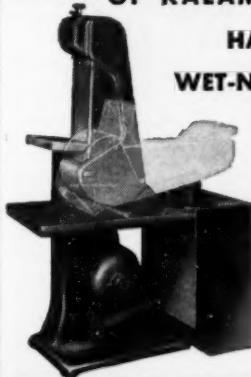
The simplified PYRO Optical is the ideal instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3½ lbs.) and FOOLPROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS. Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 80

THE PYROMETER INSTRUMENT CO.
New Plant and Laboratory, Bergenfield 3 N. J.

Hammond

OF KALAMAZOO



**HAMMOND VH-6
WET-N-DRI ABRASIVE
BELT GRINDER**

Ideal for flat surface grinding and polishing of castings, forgings, plastics, etc. Can be changed from vertical to horizontal operation by loosening one cap screw.

Hammond Machinery Builders
1614 DOUGLAS AVENUE, KALAMAZOO, MICHIGAN

Whitney-Jensen adds 40-ton press to line

The new No. 331 40-ton deep throat power punch press has been added to the line of machines manufactured by Whitney Metal Tool Co., Dept. B, Rockford, Ill.

The press has a welded steel frame, pancake type motor, heavy flywheel and gearing located at the rear of the frame, rugged shaft and ram, non-repeat clutch, and heavy bolster plate. The supporting



KING PORTABLE BRINELL

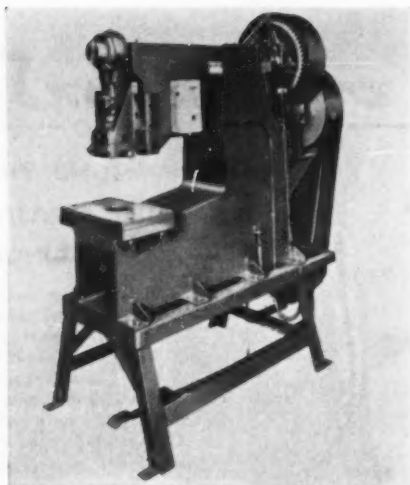
for all HARDNESS
TESTING, Throat 4"
Gap 10", Wt. 27
lbs. — ACCURATE

Puts actual load of
3000 KG on 10 mm. ball.
Test head removable for
testing very large parts.

ANDREW KING

P. O. Box 606-H
Ardmore, Pa.





structure is mostly large angle iron, all-welded. All suitable accessories are available.

Other specifications are depth of throat 24", height of throat 12", 84 strokes per minute, length of stroke 2½", maximum die space 9", bolster plate 12"x20"x1½", and 3 hp motor, weight 4110 lbs. crated.

Use ACTION Card, opposite page 64. Encircle No. 76

Welding positioner

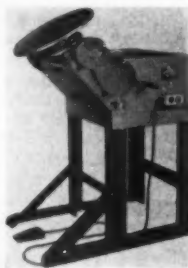
A new type bench model welding positioner, available with hand or power table tilt, has just been introduced by the American Equipment Co., Dept. 12-BB, 7 Albion St., Paterson, N. J.

The maker claims that the Aeco positioner is engineered to create a superior method of positioning work for efficient and economical downhand welding. Reversible, variable speed adjustment is under full control of the welder.

Use ACTION Card, opposite page 64. Encircle No. 77

German grinder available

Marac Machinery Corp., Dept. B, 1819 Broadway, New York 23, N.Y., announces that the type 270A cylindrical grinding machine is now available. Made by Fritz Werner AG of U. S. Zone Berlin, Ger-



many, the machine is designed for a 10" wheel, 1¼" wide and can grind up to 10" in length between centers. It is said to produce work of excellent surface finish and high precision both in the tool room and on the production line.

The workhead can be swivelled from 0° to 90°, so that steep faces and tapers can be ground on short pieces of work. The work head is adaptable for either dead center work, three jaw 3½" diameter chuck or collets mounted in the spindle.

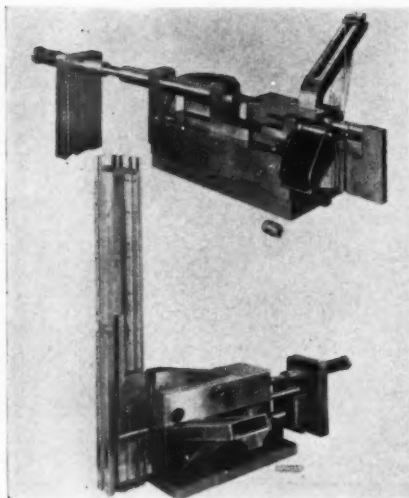
The grinding spindle turns on high precision, hand scraped bronze bearings which are force lubricated by a built-in pump. Oil pressure can be monitored by a conveniently located pressure gauge. The work table swivels 5 degrees in either direction so that tapers can be ground between centers, on long slender work, to an included angle of 10 degrees.

Both the grinding spindle and the work heads are driven by belts from individually mounted flange motors, free from vibration.

Use ACTION Card, opposite page 64. Encircle No. 78

New line of automatic loaders speeds output of dual ram broaching machines

A new line of Red Ring automatic loaders, designed to speed output of externally broached round parts on conventional dual ram vertical broaching machines, is announced by National



Broach & Machine Co., Dept. B, 5600 St. Jean Ave., Detroit 13, Mich.

These loaders, which are made in a wide variety of types to accommodate specific parts, feature magazine feeds and simple, compact feed, clamp and eject mechanisms. No auxiliary power source is required to actuate the loader mechanisms since the in-and-out travel of the dual ram broaching machine tables is utilized to impart motion to the loader feed and clamp components.

Round parts such as valve spools, universal joint needle bearing cups and similar parts on which flats or slots can be surface broached are ideally adapted to Red Ring automatic loader applications. Output of the loaders is limited only by the speed of the machine. An operator keeps the feed magazine full and the

finished parts are automatically ejected into trays or tote boxes.

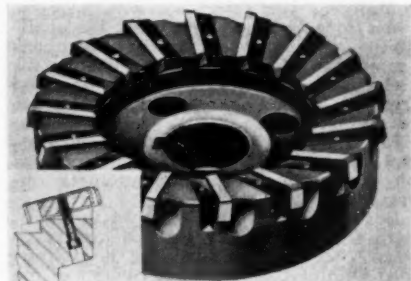
Two models are shown. The loader at the top handles 1.300-in. long, 1.0-in. dia. steel hydraulic valve sleeve. The loader at the bottom (shown with broach holder assembly) handles 3.840-in. long, 1.0-in. dia. hydraulic valve sleeves.

Use ACTION Card, opposite page 64. Encircle No. 79

Milling cutter has carbide replaceable blades

Super Tool Co., Dept. MB, 21650 Hoover Rd., Detroit 13, Mich., announces a new solid carbide inserted blade face milling cutter for milling cast iron, malleable iron, brass, etc.

A greater number of solid carbide blades permits the use of higher speeds as well as faster feeds to attain higher produc-



tion and better finish, the manufacturer claims.

This cutter is available in five standard sizes: 6", 8", 10", 12" and 14" in both right hand and left hand, as well as in specials.

Use ACTION Card, opposite page 64. Encircle No. 80

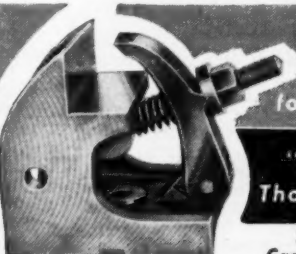
New Allenair indexing tables

The A. K. Allen Co., Dept. B, 57 Meserole Ave., Brooklyn 22, N.Y., announces the manufacture of its new Model 725-F

SAVE Time and Money
on Set-ups, without special
expensive jigs and fixtures

HART
MILLING FIXTURES

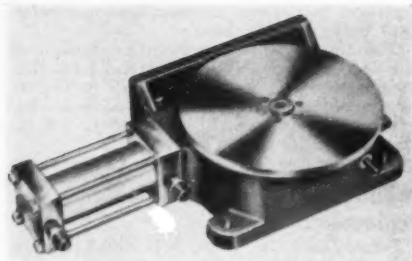
WALTER W. FIELD & SON, INC.



Write for
illustrated
folder about the

"Masters of A
Thousand Set-ups"

39 Hayward St.,
Cambridge 42, Mass.



indexing dial feed tables with the same positive lock feature as introduced on their larger models.

These tables, designed for use in areas where space is limited, have $7\frac{1}{4}$ " dia. top plate and can be mounted either horizontally or vertically.

An important new feature is the availability of compressed air at the top center of the tables, so that air clamps, air collets, or air chucks can be operated from an outside source as the tables are revolving.

Model 725-FA is furnished without control valves and Model 725-FB comes completely equipped for fully automatic operation.

Both models are available in the standard 4-6-8-12 and 24 set of indexing positions. Accuracy of indexing is guaranteed within $\pm .002$ at the periphery of the top plate.

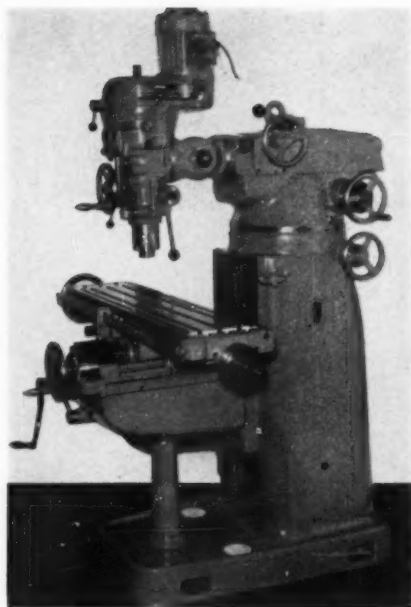
Use ACTION Card, opposite page 64. Encircle No. 81

New vertical milling machine

The Hochman Import-Export Corp., Dept. B, 56 Edison Place, Newark 2, N.J., has introduced a new vertical milling machine of advanced design. This miller, the "Trison" No. 1 vertical, is claimed to be a very versatile tool, fitting into the gap between turret millers, so popular in die and mould shops, and conventional heavy verticals. It has ruggedness and unusual capacity without bulk.

It has $9\frac{1}{16}$ "x $39\frac{3}{8}$ " table working surface; twelve feeds in all directions, from $\frac{1}{2}$ " to 20"/min. with a longitudinal traverse of nearly 27" and a maximum distance of 15" from spindle to table. The head which swivels 90° in both directions carries a massive spindle running in precision taper roller bearings. A fly wheel on the spindle shaft insures smooth vibrationless operation at all speeds even on heavy cuts.

A No. 40 standard spindle socket accepts regular arbor and adapters. Heat-treated gears run quietly and are lubri-



cated by a combination pump and splash system. Feed and speed controls are convenient.

The Miller is powered with a 2 hp motor with complete electrical controls.

Use ACTION Card, opposite page 64. Encircle No. 82

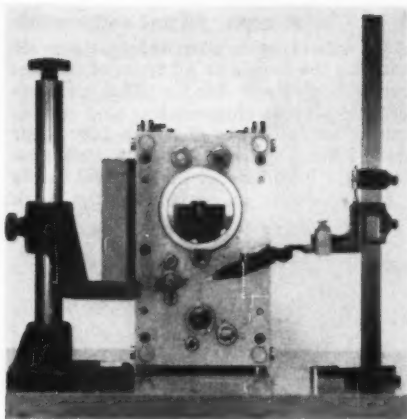
New comparator gage developed

A new comparator gage, that the manufacturer claims is superior to the planer gage method of checking gages, has been developed by Garreau & Co., Dept. B, 351 Thames St., Newport, R.I.

The new type is said to make it easier to hold parallelism, cover a wider range and obtain easier and more accurate adjustments.

The gage consists of a sturdy base, a hardened, ground and lapped column, and an elevating platform that has a 360° swing adjustment. Overall height is 11" but the capacity is increased in proportion to the number of jo blocks added to increase the height of the platform. One complete revolution of the adjustment knob will raise or lower the elevating platform approximately .001".

In a typical inspection of a drill jig where vertical distance between holes must be gaged, a pin is inserted in the lower hole and the elevating platform is



set level with the top of the pin, giving a zero-zero indicator reading. A predetermined number of jo blocks, equalling the exact vertical distance between the holes, are then placed on the platform. A second pin is inserted in the upper hole. Indicator is then set to a zero reading over the jo blocks. If the job meets the proper limits, a second zero-zero indicator reading is obtained between the top of the jo blocks and the top of the upper pin.

Similar application of zero-zero gage is recommended for gages using a .0001 indicator.

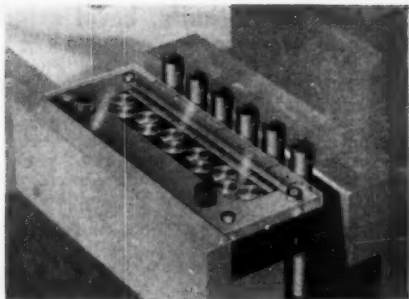
Use ACTION Card, opposite page 64. Encircle No. 83

Compensating equalizer for multiple clamping device

A new device that clamps up to 10 parts at once by automatically compensating for size differences is announced by Design Aids Co., Dept. MB, 130 North 7th St., Newark, N.J. The devices provide a definite mechanical lock for parts that are hard or soft, regular or irregular in contour. They can be applied to all types of vises for milling, grinding, etc., and can be used as component parts of jigs and fixtures.

The "compensators" have separate, sliding jaws, one per workpiece in multiple machining, which are backed up by a chamber of floating vertical rollers. These rollers shift position to exert equal pressure on each jaw. The jaws are held in the unit by a common key that permits sufficient movement in each jaw for the automatic individual take-up.

The units are available in three types: one for multiple clamping of hard-metal



parts, a second for soft material such as aluminum and plastics, and a third that will compensate for draft angle and surface irregularities on castings and forgings. (In the last case relieved sliding jaws are used to apply holding pressure at a number of points on the workpiece.) Many sizes are available in each type. The number of jaws range from 10 to 5, jaw widths from $\frac{3}{8}$ " to $1\frac{1}{2}$ ". Working parts are close fitting to prevent chips from entering the unit.

In the illustration, a clear plastic cover is used to show floating rollers. Steel cover is normally used. All parts are hardened, but any or all parts will be provided soft, if desired, along with heat treating data.

Use ACTION Card, opposite page 64. Encircle No. 84

Chicago-Latrobe fast spiral masonry drill

Chicago-Latrobe fast spiral carbide tipped masonry drills are said to penetrate easily and quietly in concrete, cement, brick, slate, marble, stone and all types of masonry materials. They produce clean sharp edged accurate holes without danger of breaking sidewalls even when holes are spaced closely together. The fast



spiral has proven to be a great aid in carrying the dust out of the hole, especially in deep hole drilling.

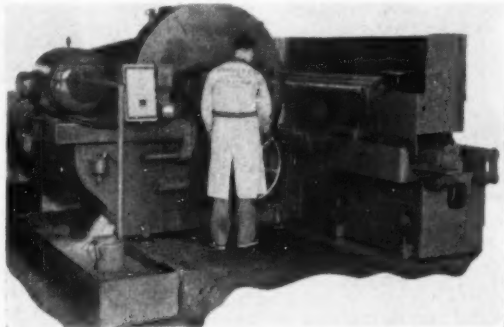
Sizes range $\frac{1}{8}$ " through $1\frac{1}{2}$ " by 16th and in extra lengths to 18" overall. Standard $\frac{3}{8}$ " shanks are furnished on sizes $7/16$ " and $\frac{1}{2}$ " unless $\frac{1}{4}$ " shank is specified, making portable drilling possible with either size chuck. Chicago-Latrobe, Dept. B, 411 West Ontario St., Chicago 10, Ill.

Use ACTION Card, opposite page 64. Encircle No. 85

Hanchett slitter knife, bevel grinders

Hanchett Mfg. Co., Dept. MB, 906 N. State St., Big Rapids, Mich., and Portland, Oregon, has developed an entirely new grinder for top and bottom slitter knives and all types of circular knives. This new grinder is said to permit grinding slitter knives to the highest of precision tolerances, both for concentricity and micro inch finish. The grinder oper-

ates wet using coolant directly applied at point of wheel contact. Slitter knives are held in a horizontal plane rigidly supported by backing plate. Fixture revolves mechanically, for smooth, uniform cutting action. Because of this positive and smooth drive, no chatter marks develop on the knife edge. The company also announces the development



of an entirely new patented machine for grinding the bevels on all types of straight knives and shear blades. This particularly applies to chipper, hog and barker knives, and all types of heavy duty shear blades. With extremely heavy cuts possible at a high rate of table travel, using a large volume of coolant on the work

pieces, knives and shear blades are claimed to be ground with no burning. The Hanchett "Big 60" Hogger features a 60" diameter segmental grinding wheel with a 5" dia. precision ground grinding wheel spindle mounted in extra heavy duty pre-loaded precision Timken bearings.

Use ACTION Card, opposite page 64. Encircle No. 14

Wheel dresser line expanded by Last Word Sales Company

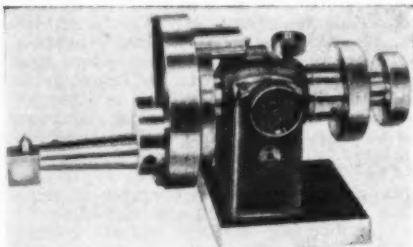
Last Word Sales Co. and Gray-Grimes Tool Co. recently announced the creation of a three-model Last Word wheel dresser line.

The Model "A" dresser, with a 3.400 center height, can be used to dress any angle tangent to a radius, concave or convex, in any precision grinding wheel. A reported advantage of this is that it permits dressing at the base of the wheel, or point of contact. It is claimed that this feature allows the use of the wheel guard and dust collector during the dressing operation.

The Model "B" (2.600 center height) is designed to fit smaller surface grinders; 25% smaller than the "A" model. The Model "B" will dress a radius and any two tangent angles in one operation. It will dress male radii to 1" and female

radii to 2", with tangent angles to $\frac{3}{4}$ " maximum length, on wheels up to 7" in diameter.

The compound wheel dresser, Model

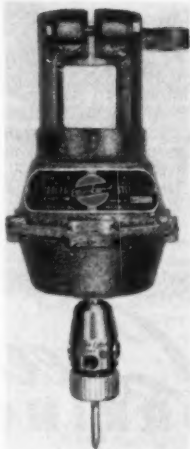


"C," incorporates a tilting feature which is designed to compensate for compound angles involved in grinding form tools. Last Word Sales Co., 18502 Mt. Elliott, Detroit 34, Mich.

Use ACTION Card, opposite page 64. Encircle No. 15

New Ettco-Emrick tappers feature faster operation

Engineering improvements together with a newly developed clutch qualifies the new Ettco-Emrick tapping and threading attachments to deliver the highest speeds and smoothly controlled clutch power, according to the manufacturer.



Features include: Aluminum clutch has been replaced by a completely redesigned steel clutch; leather friction material has been replaced with a new, tough-fibered, rubber bonded synthetic material impervious to heat, oil and wear; thick-walled, heavy ribbed die cast cases in a modern design contain four to six ounces of No. 30 oil, sealed in at the factory prior to shipping; the steel clutch incorporates a built-in fan which whips the oil into a mist, drawing it across the clutch faces, for long clutch life; a rigid chuck spindle supported at both ends by oilite bushings and equipped with the new Ettco-Emrick visible grip tag holding chuck. Ettco Tool Co., Inc., Dept. B, 594 Johnson Ave., Brooklyn 37, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 90

Air filter-regulator-oiler

A new combination air filter-regulator-oiler unit with maximum operating pressure of 160 psi, recently introduced by Air-Mite, Dept. B, 4417 W. Carroll Ave., Chicago, Ill., offers more accurate and stable line pressure regulation, precisely controlled oil injection and an extremely efficient air filtering method, according to the manufacturer. Permanent mold castings, brass fittings and hi-strength transparent plastic bowls are used.

Longer service life and faster response to air demand are claimed for the regulator in the new unit, as it incorporates a piston cup instead of the conventional diaphragm. Rugged construction and positive action of the new piston cup design is said to eliminate much of the wear factor. This feature, coupled with line-

sized orifices, provides maximum air flow with the least "line lag."

The filter features a porous, cone-shaped sintered bronze filtering element. A brass drain cock permits quick removal of moisture and sediment.

The lubricator provides controlled injection of pre-atomized oil directly into the air stream. By pre-atomizing the oil before it is introduced into the air stream, the lubricator insures that a protective oil film is available the instant the air leaves the unit. A simplified adjustment permits balanced oil supply to air demand, preventing overloading the air stream.

Use ACTION Card, opposite page 64. Encircle No. 89

Straightening press

The new straightening press introduced by Lempeo makes it possible for any shop to do its own straightening work, according to the manufacturer. It saves unnecessary grinding and turning, enabling the cutter or grinder to remove only enough material to true up the diameter of shaft and bring the surface to the desired finish.

Any shop employing lathes or grinders with beds having capacities over three feet can use such a press to advantage.

This press features a frame that looks much like a sawhorse, with underslung hydraulic pump and cylinder, which—in turn—is fastened to the shaft by means of an open-throat clamp. Pressure on the shaft is exerted at one or more points along its length until the dial indicator mounted on the frame shows identical reading at each point. The V blocks can



be moved along the bed; so does the hydraulic pump, making it possible to straighten small work measuring only a foot or more up to large seven to ten foot shafts, with minimum handling.

The press measures 65" along the bed, special sizes made to orders. Lemco Products, Inc., Dept. B, Bedford, Ohio.

Use ACTION Card, opposite page 64. Encircle No. 95

Williams redesigns open-end-box wrench line

A redistribution of weight is said to have created better balance through



slimmer heads, longer and narrower handles in the new Williams line of open-end-box "Superrenches." Both heads have same size openings in a range of sizes from 1/4" to 1 3/8". J. H. Williams & Co., Dept. B, 400 Vulcan St., Buffalo 7, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 96

HERE'S HOW TO *Speed*

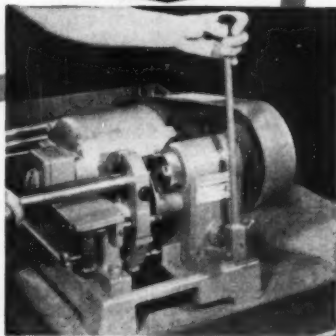
TUBE DEBURRING

- CHAMFERING
- POINTING
- FACING
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PINES
No. 600

The Pines No. 600 End-Finishing Machine is designed for fast, accurate work. Women operators commonly debur up to 800—1" tube ends per hour. Exclusive operating features include single lever control which clamps and feeds work to rotating cutters in one pass, enabling operator to have one hand free for stock handling. Small and compact,

the Pines machine is equipped with quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, and grease-sealed precision bearings. The No. 600 unit illustrated, handles stock diameters up to 2". Maximum feed stroke is 1 1/4". Automatic air-operated units are also available for higher production work, and larger models for stock sizes up to 5".



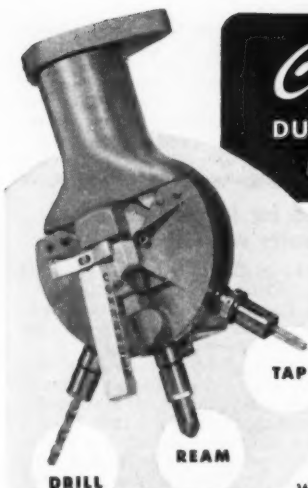
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Write for facts on how these machines cut costs on a wider range of work.

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Commander SELECT-A-SPINDLE

DUAL SPEED DRILL PRESS TURRET

DRILLS, REAMS, TAPS ON 1 DRILL PRESS SPINDLE!

- Fits Any Drill Press • Increases Production
- Reduces machine, fixture costs

Commander Select-A-Spindle permits you to do 3 operations on a single drill press spindle . . . save time . . . eliminate multiple handling of piece parts, speed production and reduce overall costs. Dual Speed Select-A-Spindle permits selection of proper speed for each operation. Quick, positive hand indexing positions each tool accurately for sequence operations. Select-A-Spindle is built to tap with any 1, 2, or all 3 spindles to the full capacity of the unit. Adjustable torque control spindles for protection of taps to 1/4" available.

Write for illustrated circular on Select-A-Spindle, other Commander Production Tools and name of your nearby Commander Distributor

Commander MFG. CO.

4227 W. KINZIE STREET, CHICAGO

PRODUCT OF COMMANDER

BUILDER OF PRODUCTION TOOLS

Automatic features adapt new large size precision surface grinders to robot-like production operations

A combination of advantages is claimed in the new, large size hydraulic surface grinder manufactured by The DoAll Co., Dept. B, Des Plaines, Ill., the Model D10. These are:

- Significantly larger working area (10" x 30" chuck size).
- Far-sighted design permits ready incorporation of modifications (at factory) for automatic flat or crush form

(contour) grinding operations making possible mass production of parts with precision comparable to tool room made parts.

In form grinding (manual or automatic) the large work capacity of the new model permits the crush roll dresser or other kind of form dresser to be positioned permanently at the ends of the work table while adequate space remains for work. In ordinary form grinding, and particu-

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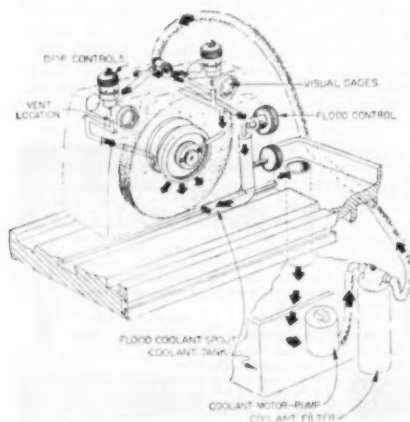
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larly in production form grinding operations where frequent wheel dressing is required, time is saved since the initial dressing setup remains on the grinder eliminating painstaking re-setups.

Equipped with the proper optional features, the Model D10 surface grinder can be used as an automatic crush form grinder which will transfer the contour of a crush dressing roll to the work. Where practical, many pieces may be held in a fixture and ground simultaneously. For such automatic machines, comparatively little skill is required on the part



of the operator other than familiarity with the functioning of the machine's controls. With the inclusion of additional optional features, the machine is arranged for automatic surface grinding where the object is to produce a flat surface, accurate in thickness to a predetermined dimension.

Use ACTION Card, opposite page 64. Encircle No. 99

New method for lapping shoulder faces of shafts recently developed

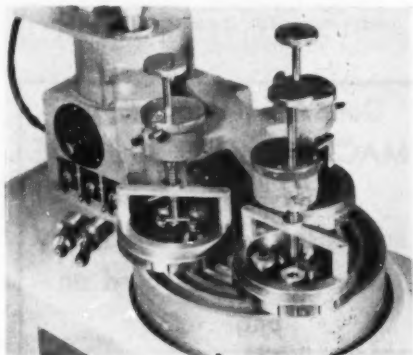
Crane Packing Co., Dept. MBW, 1800 Cuyler Ave., Chicago 13, Ill., manufacturers of the Lapmaster lapping machine, have recently developed a method for lapping shoulder faces of shafts.

The method consists of providing the lap plate with a series of annular grooves to accommodate the stem of the workpiece and allowing the shoulders to "ride" the top of the lap plate during the cycle. The fuel pump parts are pre-loaded into a special brass cylindrical work holder which has been bored out slightly oversize to the diameter of the workpiece. These special work holders provide the necessary weight and needed balancing properties, it is claimed.

The adjustable roller guides located at the base of the conditioning ring guide stems are so located to the perimeter of the work holder that the parts being lapped will be held in proper position. Ball bearing races in the guides reduce friction to a minimum and the work is free to rotate in its own orbit on the lap plate.

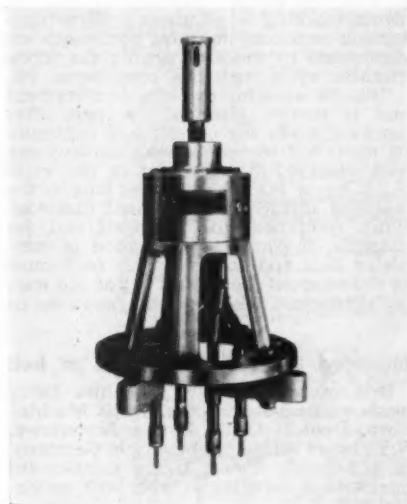
In order to overcome the amount of wear caused by the work on the lap plate the conditioning rings are spring loaded. This provides a greater downward force of the conditioning rings on the lap plate.

Use ACTION Card, opposite page 64. Encircle No. 100



Universal joint tapping head

Errington Mechanical Laboratory, Inc., Dept. B, Staten Island 4, N.Y., announces the introduction of an entirely new universal joint tapping head. It enables the user to speed up production and insure greater accuracy, the manufacturer claims. The new tapping head is avail-

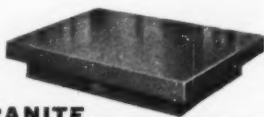


able in two sizes: No. 0—0" to 1/4" tap capacity 4 and 6 spindles; No. 1—7/32" to 1/2" tap capacity 4, 6 and 8 spindles.

These tapping heads are made of sand cast aluminum with hardened ground gears and spindles (made in one piece). Ball thrust bearings at all thrust points are fully grooved.

Use ACTION Card, opposite page 64. Encircle No. 123

SURFACE PLATES



BLACK GRANITE

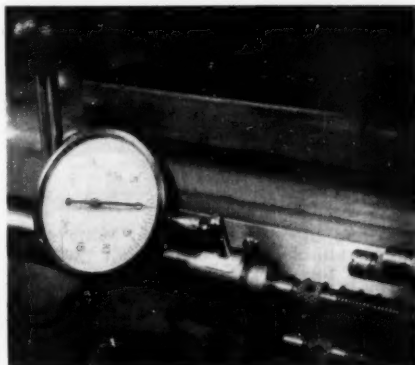
Precision surface, accuracy .0001. Durable, made from the hardest black granite. Finest surface plates available. Sizes 12"x18" to 48"x96" and others. Write for list and prices. Dealer inquiries invited.

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Since 1915

POSITIVE Stop Attachment

*for any turret lathe
having multiple stop roll*



Pat. Pending

• Particularly suitable to W & S, J & L and Gisholts. Be sure to specify make and model. *Guaranteed to hold to .001 on any lateral dimension from face off to steps, grooves, etc. Eliminate human element of feel.*

Saves time on set-ups and between shifts. Exceptionally accurate and fast on re-work. Chrome plated and case hardened for longer life.

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Dealer Inquiries Invited

One Thousandth Stop Co.

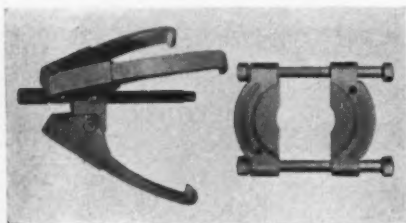
P. O. BOX 2217

VAN NUYS,

CALIFORNIA

Williams announces new line of gear pullers

The latest refinements in design are claimed to have been incorporated in Williams pullers, J. H. Williams & Co., Dept. BB, 400 Vulcan St., Buffalo 7, N.Y. Jaws and blocks are forged and heat-treated. Jaw clips are self-adjusting. Forcing screws are heat-treated. New "unified" thread on screws and blocks;

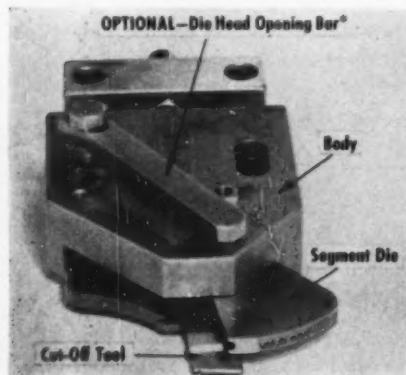


two and three-jaw styles, in many sizes, are available with changeable jaws to extend the range of their use and capacity. Several styles of "all-purpose" and slide hammer pullers are equipped with many attachments.

Use ACTION Card, opposite page 64. Encircle No. 124

Automatic marker performs two operations at one station

A dual-operation screw machine tool that performs marking and cutting off on automatics is announced by New Method Steel Stamps, Inc., Dept. B, 147 Joseph Campau, Detroit 7, Mich., as the latest addition to its line of automatic roll markers. The Model 700 automatic



marker can be used in conjunction with almost any suitable screw machine tool for cutting off, etc.

In addition to giving the screw machine operator an extra station to perform necessary work, the Model 700 permits greater production by reducing the length of the machining cycle. By combining marking with cutting off operation, the 2 to 3 second dwell normally required for swing marking is eliminated. Time consuming secondary marking operations are eliminated by marking during the screw machine cycle, reducing cost, scrap, etc.

The die used for marking is a segment and is carried clear of the part after marking while the cut-off tool continues its operation to completion. Marking can be performed at any point in the automatic screw machine cycle as long as the marking surface is at its final diameter. When combined with a cut-off tool, for example, the marking operation is completed first and the cut-off is performed as the segment die swings out of the way.

Use ACTION Card, opposite page 64. Encircle No. 125

Imported grinder uses wheel or belt

One of several new machines being made exclusively for the Curtis Machine Corp., Dept. B, 1300 E. 2nd St., Jamestown, N.Y., by an affiliate company in Germany, is a versatile swing frame grinder for use with a grinding wheel, buff or abrasive belt.

This grinder, Model PB-1, can be used in small, as well as large, plants for a



variety of operations. It can be suspended and thus brought to heavy or bulky work. It can be rigidly mounted and used as a variety grinding and polishing unit, such as mounting on a lathe for o. d. grinding and polishing.

Features claimed are: Compact design, rugged construction, adjustable balance, high speed maneuverability, positive and convenient tracking mechanism and belt tensioning. The 3 hp motor produces 3400 rpm providing 7700 sfm.

Use ACTION Card, opposite page 64. Encircle No. 126

Plastic package for taps

The Hy-Pro Tool Co., Dept. B, New Bedford, Mass., has announced a new transparent package for their Hy-Pro taps. These plastic packages have been designed by Hy-Pro for immediate visible identification.

They are intended to cut costs in faster inventory counts, quicker size and thread checks, less storage space, and 80% lighter weight for shipping.

Use ACTION Card, opposite page 64. Encircle No. 127

SAVE UP TO 85% ON GOVERNMENT SURPLUS



MAGNI-FOCUSER

Has fine ground lenses of optical glass. Neutralizes eye strain from close work. Bimocular design gives third dimensional vision. Allows freedom of both hands. Wear over glasses. Plastic frame with adjustable headband.

SIZES: 20" focal lgth. 1 1/2 power - 14" focal lgth. 1 1/2 power, 10" focal lgth. 2 1/2 power, 8" focal lgth. 2 1/2 power price each ONLY

1050

OTC TOOLS

See our complete line. Pullers for Gears, Bearings, Wheels, Pulleys, Bushings, Shafts, etc.



NEW 10 TON HYDRAULIC PRESS

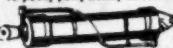
Use this Press in the Shop or take it with you on the job.

Frame is 4" welded channel iron. Has 4 1/2" stroke, 2 1/2" diam. ram. Valve operates piston in both directions. Adjustable platform. Positive power Hand Pump with handle. 2000 PSI pressure gauge.

12900

HYDRAULIC EQUIPMENT

We stock over 100,000 Hydraulic Cylinders in 106 different types and sizes. These can be adapted wherever tremendous power is needed to push, pull, hoist, mould or drive, etc.



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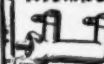
Gives 20,000 lb. thrust using 1500 PSI line pressure as obtained from our hydraulic pumps. Will produce up to 40,000 lb. thrust with 3000 PSI. Can also be used on a low pressure USED sure air system. Has 4" bore; 18" stroke; 30 1/2" long. Ideal for shop.

Part No. 29

NEW 4395

HYDRAULIC HAND PUMP

Operating pressure 1500 PSI. Cap. 1.5 cu. in. per stroke. complete cycle . . .



1275

HYDRAULIC ACCUMULATORS



A-28 FLOATING PISTON TYPE - 4" x 18" Built to stand 2,000 PSI

1275

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High temperature thread compound prevents seizing and galling

A new high temperature thread compound that is said to protect against the welding action of threaded connections subjected to prolonged exposure to extreme heat has been developed by Crane Packing Co.

Known as "Thred-Gard" it is said to eliminate seizing and galling at operating temperatures up to 1200° F. The com-

pound is non-hardening and acts as a Gard allows fittings to be drawn up to a greater degree of tightness without undue stress or strain. It acts as a protective coating to keep threaded surfaces smooth and insure pressure-tight, metal to metal contact.

The product is available in $\frac{1}{2}$ pint, 1 pint and 1 quart cans. Crane Packing Co., Dept. MBW, 1800 Cuyler Ave., Chicago 13, Ill.

Use ACTION Card, opposite page 64. Encircle No. 128



Announcing New J. I. C. Wiring Boxes

at sensationally low prices

These rugged steel wiring boxes are completely oil and water splash proof as well as dust proof. THEY COMPLY WITH ALL J.I.C. ELECTRICAL SPECIFICATIONS FOR JUNCTION BOXES. There are no screw holes in the cover or knockouts to admit oil. The neoprene rubber gasket on the cover provides a tight seal. The cover can be removed by loosening only one screw. Most sizes may be obtained with a removable panel plate for mounting terminal strips or other electrical equipment.

Ideal for Machine Tool Wiring — Many purchasers now demand that the electrical wiring and controls for machine tools be enclosed in oil-tight boxes. When oil, chips or water get into the machinery electrical circuit, the resultant "down time" is costly. Hoffman J.I.C. wiring boxes help eliminate this trouble. Ford, General Motors and Chrysler are some of the users of these new junction boxes.

Write today for a sample. Standard sizes are:

4" x 4" x 3"	10" x 8" x 4"
6" x 4" x 3"	12" x 10" x 5"
6" x 6" x 4"	14" x 12" x 6"
8" x 6" x 3½"	16" x 14" x 6"

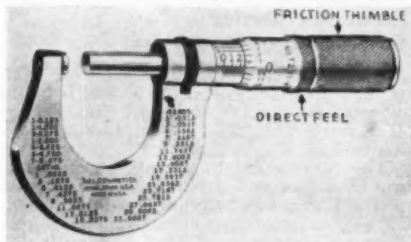
Prices range from \$2.75 to \$9.95

HOFFMAN ENGINEERING CORP.

Manufacturers of Wiring Troughs & N.E.M.A. 12 Panels
Anoka, Minnesota

Starrett satin chrome micrometer caliper

A new micrometer caliper introduced by The L. S. Starrett Co., Dept. B, Athol, Mass., has both friction control and direct feel in a single micrometer designed for one-hand use. An improved friction con-



trol mechanism is built into the upper portion of the thimble within the span of thumb and fingers where it is easy to reach and easy to use for fast, accurate repetitive measuring.

With the friction thimble feature (controlled by the outer portion of the thimble) the spindle will not advance after the correct contact pressure is applied, insuring uniformly accurate readings on all measurements.

Use ACTION Card, opposite page 64. Encircle No. 140

HOW TO SAVE CUTTER COSTS!



Case History . . .

An automotive parts supplier reduced his cutter costs by over 25% with our woodruff keyseat cutters. These tests were conducted under actual production conditions. Get the details of this cost reducing story.

We are woodruff keyseat cutter specialists and have been for over 30 years. Fast service on special cutters. Jobbers, Mill Supply and Mfg. agents inquiries are welcome.

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16 page catalog

ACTUAL SIZE ▶



CONICAL TOOL CO.

3801 Buchanan S.W.
Grand Rapids 8, Michigan

Bench model drill grinder takes 1/8" to 2 1/2" drills

A new bench model drill grinder, Sterling Model "DB," has recently been announced by the McDonough Mfg. Co., 1552 Galloway St., Eau Claire, Wis. This new bench model grinder operates on the same principle and has the same capacity as the Model "DA" drill and carbide grinder. The new Model "DB" is a single purpose machine and does not have the carbide tool grinding feature that is included on the pedestal model "DA."

This grinder has a capacity for 1/8" to 2 1/2" drills and handles 2, 3, and 4-lip



drills without any change in setup. No collets or jaws are required to hold the drills.

A built-in diamond holder for accurately dressing the wheel is incorporated in the unit.

Use ACTION Card, opposite page 64. Encircle No. 142

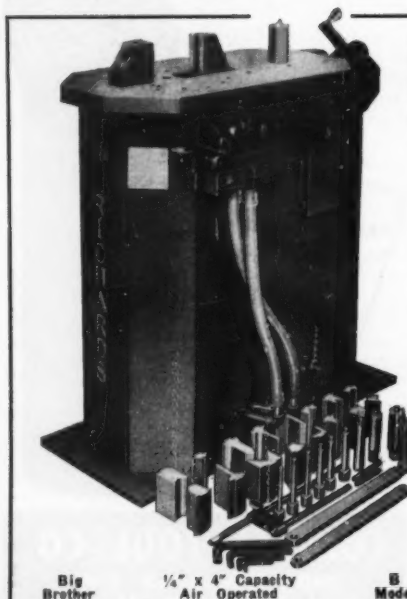
Inside micrometer for lengths up to 30 feet

An inside micrometer capable of high accuracies to lengths up to 30 feet is being offered on special order by the Brown & Sharpe Mfg. Co., Dept. 43-B, Providence 1, R. I.

The instrument has a minimum reading of 6 feet and a maximum of 30 feet, and will measure any dimension between. A special micrometer head and 25 extensions, used in combination, permit this broad coverage.

In order to minimize inaccuracies in such long members, each extension is calibrated to the nearest ten-thousandth, permitting over-all accuracy which is usually far better than that required in such large dimensions. For portability, the entire set is packaged in a convenient carrying case.

Use ACTION Card, opposite page 64. Encircle No. 143



Big
Brother

1/4" x 4" Capacity
Air Operated

B
Model

MULTIFORM BENDERS

Now a faster method of changing set-ups on the stationary head. The head is built of alloy steel for greater strength.

**Eliminate Special Tooling Cost
Reduce Set Up Time
Boost Production**

IF

**Fabrication is a Problem - Solve it
with a Multiform.**

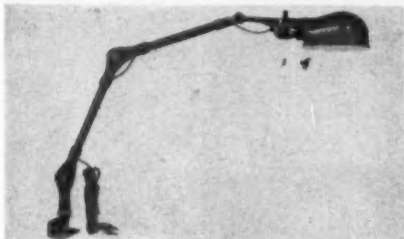
**Bus-Bars - Brackets - Stampings -
Springs - Steel Rule Dies, etc.**

Write today for literature

**J. A. RICHARDS COMPANY
KALAMAZOO, MICHIGAN**

Fostoria announces new Localite models

Many new features are claimed for the new 1954 Fostoria Localite line for lighting machine tools, inspection uses, and assembly benches. Arm joints are of new patented tension disc design providing



smooth adjustability with one hand.

Reflectors, available in several new designs, rotate 360°. The Fostoria Pressed Steel Corp., Dept. B, Fostoria, Ohio.

Use ACTION Card, opposite page 64. Encircle No. 144

Don't forget to mention MACHINE and TOOL BLUE BOOK when writing Service card on page 64.

DEVCON PLASTIC STEEL

For Making

JIGS

FIXTURES

DIES

**FILLING LARGE
HOLES IN CASTINGS**

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CHEMICAL DEVELOPMENT CORP.
Danvers, Massachusetts

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range:

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136 Lafayette St., New York 13, N.Y.

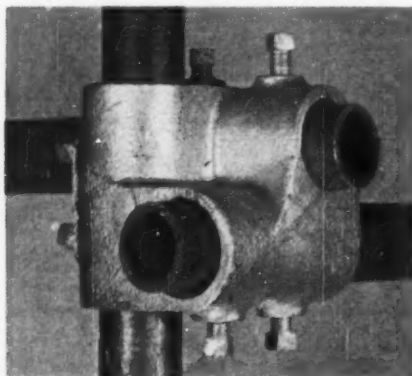
Telephone: WALKER 5-4048

Versatile fittings used with standard pipe to make storage racks

Rugged storage racks made of Amidon fittings and standard pipe can be assembled in a short time for any material or weight in a wide range of sizes and capacities. Racks are completely disassembled and fittings stored in small space when no longer needed. Dimensions can be altered as space demand and as storage needs change. Same fittings and pipe can be used to erect adjustable scaffolds for plant maintenance. Amidon Engineering Co., Dept. MB, 369 Cleveland Rd., Elyria 20, O.



Use ACTION Card, opposite page 64, Encircle No. 12



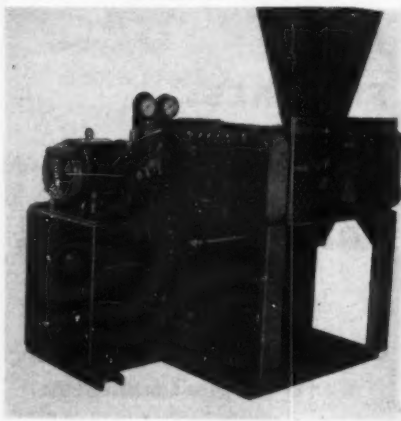
Plastic preforming machine

The Logan Engineering Co. has introduced a new type of hydraulic preforming machine for the plastic industry. An electronic automatic control system, using plug-in type relays and long-life cold cathode tubes governs piston movements in increments of 1/25th of a second.

Hydraulic pressures can be dial set and preformer operates on full automatic basis. In contrast to the mechanical type of preformer, double stroking of preforms will not result in machine failure with possible production shut-down because the safety controls automatically stop the machine, even for lack of material or over-filled tote boxes. Selective

pressure range is 0 to 125 tons on the die which may have single or multiple cavities. Preforms up to 25 sq. in. in area and 1 3/4" thick and weighing as much as 1 3/4 lbs. each have been made in the general purpose materials for use in large radio and television cabinets. The hydraulic control system is so accurate, according to the manufacturer, that weight and thickness of pills or preforms can be controlled with a variance of not more than 1/2 of 1%. Logan Engineering Company, Hydraulic Division, Dept. B, 4901 West Lawrence Ave., Chicago 30, Ill.

Use ACTION Card, opposite page 64, Encircle No. 13



Aluminum pocket level

The new Stanley No. 188 pocket level with pocket clip, made by Stanley Tools, New Britain, Conn., weighs less than an ounce. A fountain pen type tool for mechanics, maintenance men, engineers, service men and handymen, it is made of extra strong heat-treated hexagonal aluminum tubing five inches long. Stanley Tools, Dept. B, New Britain, Conn.

Use ACTION Card, opposite page 64. Encircle No. 147

PRECISION TOOLMAKERS VISE



1 1/4" Jaw \$18.40

1 3/4" Jaw \$32.95

Precision ground square and parallel to .0004/in. non-cumulative. Ground dovetailed slide. Hardened and ground jaws. Dustproof enclosed screw. Ample clamping grooves. Excellent for jig-boring, precision grinding, inspection. 10 day money-back GUARANTEE.

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NO-DUST
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- Protect your employees' health.
 - Protect nearby machine tools from dust and grit.
 - Save floor space — requires only 4 1/2 square feet.
- For 10", 12", and 14" wheels.
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All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

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SPECIFICATIONS:

Open width 1/8" to 6"

Gage Material .040 to .125

Pin Diameter .101 to 1/4"

Lengths to 120"

SEMI-OFFSET

SPECIMEN

With DYKEM Steel Blue Without DYKEM Steel Blue

DYKEM STEEL BLUE

Stops Losses

making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY

2301G North 11th St. • St. Louis 6, Mo.

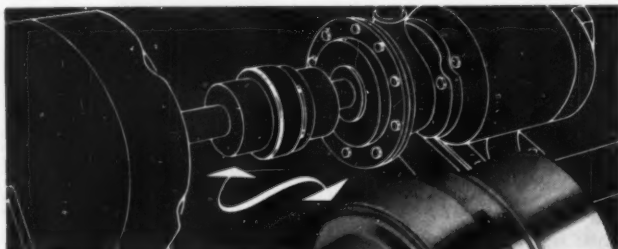
Nilson clutch reel has automatic stop control

A new type medium size wire and stock reel designed with a 4" oscillating movement is now being manufactured by the A. H. Nilson Machine Co., 1511 Railroad Ave., Bridgeport, Conn. The oscillating feature reduces the load on the feed mechanism of the machine and, by means of a limit switch, automatically stops the machine in case of wire entanglement on

the reel.

Used with medium size wire coils, the new clutch reel is specially useful in shops where one operator handles more than one machine.

The reel is furnished in two sizes. The Model 51-L has a coil capacity of 175 pounds and an 8" minimum inside diameter. The Model 51-M has a 250 pound coil capacity and a 12" minimum inside diameter. A. H. Nilson Machine Co., Dept. B, 1523 Railroad Ave., Bridgeport, Conn.



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machinery
with**

*maintenance
free*

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FLEXIBLE COUPLINGS**

When you install Lovejoy Flexible Couplings you get more than just long-lasting smooth power transmission. You get maximum protection against surge, backlash and starting torque. You get reduced down-time and less maintenance, since cushions can be changed without shutdown and **Lovejoy Flexible Couplings never require lubrication.**

Accurately machined bodies and jaws and cushioning materials engineered to the load conditions are combined in a compactly designed coupling to keep your machinery running better . . . longer.

Types and sizes for all applications

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LOVEJOY FLEXIBLE COUPLING CO.

4829 West Lake St.

Chicago 44, Ill.

Fine-adjustment sliding swivel gives smooth, precise indicator setting

Smooth, positive positioning of dial gages graduated in ten-thousandths is claimed with Rocheleau's newly developed fine-adjustment sliding swivel, without tapping or otherwise jarring the indicator rod.

This rigid, patented device has a separate clamp for each rod ($5/16$ " or $3/8$ " sizes), by which approximate setting of the indicator is quickly completed. Final, precise positioning is then smoothly and accurately made by slight movement of the convenient lever "A." No dial-holding



rod is required, as all adjusting is done with the device itself.

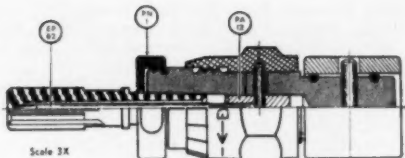
Applications cover a wide variety of inspection, toolmaking, and general machining operations. As a complete unit, it may be attached to any indicator base now on the market, or the fine-adjustment mechanism may be used on boring, milling, shaping, or planing machines or fixtures requiring a dial indicator. L. A. Rocheleau Tool & Die Co., Dept. BB, 651 North Main St., Leominster, Mass.

Use ACTION Card, opposite page 64. Encircle No. 104

Expansion reamer unit eliminates sizing

EX-R Reamer & Tool Corp., Dept. B, 127 North St., Rochester 4, N.Y., has introduced a new expansion reamer unit said to eliminate sizing of new reamers.

The unit consists of a holder and an expansion reamer and is available in three models to cover a complete reamer



Typical Cross Section of No. 1 Holder with Reamer

size range from $1/8$ to $7/8$ -inch dia. When the size of the reamed hole approaches the low limit, a slight adjustment of the graduated sleeve is said to restore the reamer to its original size.

The .006-in. expansion represents six reamers in one in steps of .001-inch, or 12 in one in steps of .0005-inch.

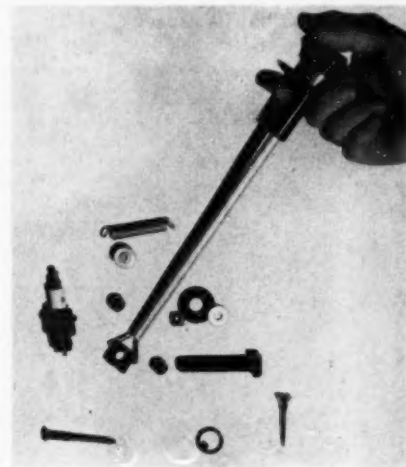
Designed for single or multiple spindle automatics, or for any machine where the stock rotates and tools remain stationary, the hss reamers are front cutting only, and can be removed from the holder by means of a special nut contacting the shoulder of the cutting tool.

A floating bushing permits the reamer to "float" into a previously drilled hole, even if slight misalignment exists between the machine spindle and turret hole.

Use ACTION Card, opposite page 64. Encircle No. 105

Handy gadget for retrieving in hard-to-get-at places

Max Rujder, Dept. B, 40 W. 83rd St., New York 24, N.Y., announces the Gripling, a handy instrument for retrieving



lost articles from difficult spots.

As shown, the tool opens when the thumb depresses the button and closes to grip the object when released.

It is said to be especially useful for machine tool workers, fitters, electricians, locksmiths, tinsmiths, etc., or anyone working with screws, bolts, nuts, hot objects, etc.

The Gripling comes in lengths of 9", 14", 20", 30", 55".

Use ACTION Card, opposite page 64. Encircle No. 106

Sheet metal bending brake

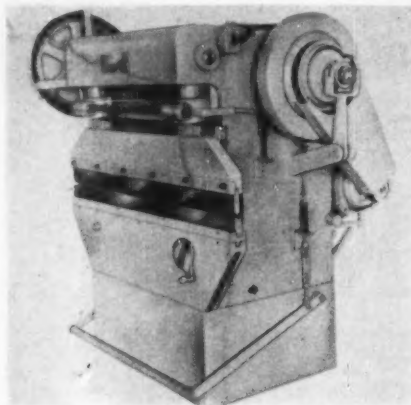
W. Whitney Stueck Inc., Dept. B, Old Saybrook, Conn., has just developed an improved sheet metal bending brake for production runs to be known as the "Connecticut" press brake.

Powered by a $\frac{3}{4}$ hp motor, the brake is said to bend 16 gage mild steel 4' wide over a $\frac{1}{2}$ " die opening or 10 gage 2' wide over a $1\frac{1}{8}$ " die.

The brake has a speed of 40 strokes per minute, with deflection minimized by specially designed support of the main crank shaft at both ends. A reversing switch permits the ram to be backed off in case of jamming.

A special feature of the new "Connecticut" is the accurate back gage which is built in as standard equipment and is operated from the front, convenient to the operator. This permits rapid accurate re-setting, speeding up production on varied bending operations, such as electrical and electronics cabinets, panels and chassis, prefabricated ducts, angles, channels and tanks. It may also be adapted to multiple punching within its capacity.

Standard features include oilite bear-



ings on all shafts, anti-friction bearing mounting on the flywheel, and extra wide 32" clearance between the side frames. Maximum die space is 7", stroke 2" and adjustment $1\frac{1}{2}$ ", giving a shut height over die block of $3\frac{1}{2}$ ".

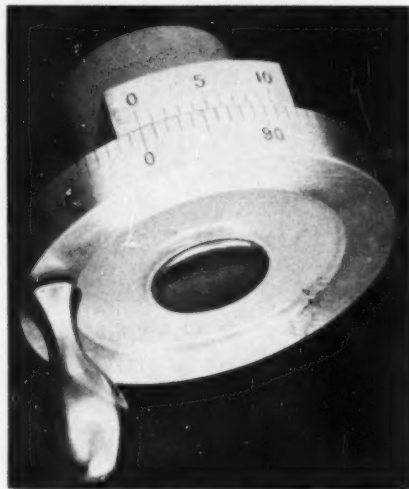
Use ACTION Card, opposite page 64. Encircle No. 107

Vernier dial replaces lathe handwheel

Precision graduated, the Walenar Vernier dial is designed to replace the handwheel on 9"-13" lathes.

The nearly $\frac{1}{8}$ " spacing of the graduations is claimed to enable operator to work with ease to tenths of a thousandth. Miking is reduced to the minimum. Repeat settings can be easily made.

This dial is simple to install, requiring no alteration to the machine to which it may be applied. Developed for the Logan



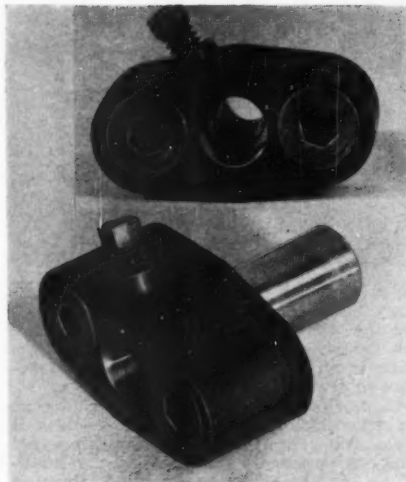
lathe, it is adaptable to other popular makes. It is made of heat-treated aluminum, with filled graduations, precision cut. Walenar Inc., Dept. B, 551 Concord St., Holliston, Mass.

Use ACTION Card, opposite page 64. Encircle No. 108

Improved Tap Hole-der

The American Cam Co., Dept. B, Hartford 1, Conn., has made the through-hole design available in an adjustable tap holder.

In addition to the advantages of having the hole all the way through, rather than blind, the new adjustable Tap Hole-der



provides full adjustability over a total of $\frac{1}{4}$ ".

As in the non-adjustable Tap Holder, the through hole design eliminates downtime customarily required for cutting off the tap shank, makes it unnecessary to remove the bushing to extricate a broken tap, and prevents identifying information from being ground off the tap shank.

Another feature of this new design is the elimination of binding of the actuating mechanism. The shaft contains no working parts to be affected or permanently damaged by excessive tightening of the turret locking bolt.

Both models are made of special alloy steel, hardened and precision ground.

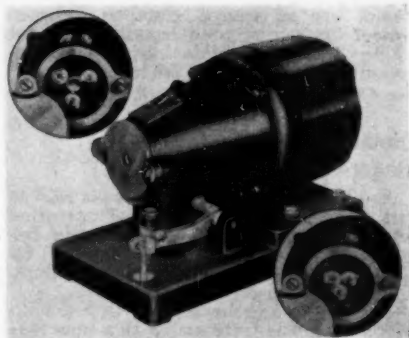
Use ACTION Card, opposite page 64. Encircle No. 109

Self-centering wire stripper provides extra cutting edge

A triple-disc cutting mechanism that automatically centers the wire it strips of insulation and provides its own extra cutting edges is the feature of the High Speed wire stripper manufactured by High Speed Hammer Co., Inc., Dept. MB, Rochester, N. Y.

Insulation is removed by three hardened steel discs, illustrated in inset photos in open and in cutting position. The discs are angled into cutting position slightly overlapping each other. Preadjusted to cut thru the insulation, the slight pressure on the core of the wire at the intersection of the three arcs centers the work.

A set of cutting edges is replaced by



loosening and turning each of the three discs slightly.

The stripper, a $\frac{1}{4}$ hp bench model designed for high speed production line stripping, removes all types of insulation including plastic types from solid, stranded or multi-conductor wire.

Provision has been made for simple adjustments for diameters up to $\frac{1}{2}$ " and for strips to $1\frac{1}{2}$ " in length.

Use ACTION Card, opposite page 64. Encircle No. 110

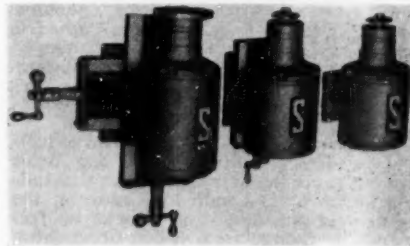
Redesign motorized spindles and vertical spindle grinders

The Standard Electrical Tool Co., 2486 River Road, Cincinnati 4, Ohio, has redesigned their line of motorized spindles and vertical spindle grinders.

Illustrated are three models, one with flat mounting pad only, another with vertical hand feed parallel to the spindle, while the third shows vertical and horizontal feeds.

The feeds are available with crank handle or hand wheel, micrometer dial, with graduated swivel either on the motor mounting as related to the feeds, or for swiveling the entire assembly. Design permits mounting in any position.

One feature of the new design is op-



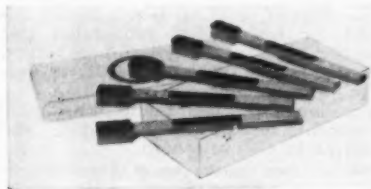
tional use of wheels clamped between wheel flanges, or with backing plate for using Type 2 cylinder type of plate-mounted cup grinding wheels.

Use ACTION Card, opposite page 64. Encircle No. 111

Diamond dressing tool has finger-tip control

A diamond dressing tool that is said to cut the cost of diamond wheel operation and assure longer carbide tool life between grinds has been announced by United States Diamond Wheel Co., Dept. BB, 835 Illinois Ave., Aurora, Ill.

The device is a hand hone tipped with diamond concentrate and with a new feature that reportedly insures more accurate operation—finger-tip control by means of



a hollowed-out finger rest near the end of the hone. It is available in single or double end styles and in all required diamond grit sizes.

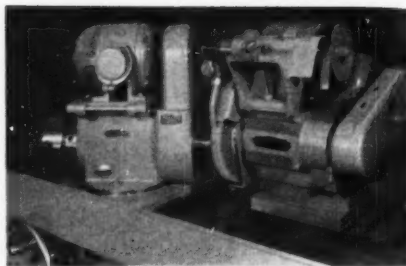
The finger-tip control permits the hone to fit firmly in the hand for controlled tool dressing without removing tool from machine. It is said to be applicable to all general and special shop requirements and to provide a complete range for tool and cutter dressing. The hones are packaged five in a box, each with a different diamond grit size.

Use ACTION Card, opposite page 64. Encircle No. 112

Norton announces new universal grinding machine, versatile, simplified setups

A new universal grinding machine, the 12" Type U-4, said to be designed to provide extra versatility through simplified setups and fast, precise grinding action for limited production items, has been announced by The Norton Co., Dept. B, Worcester 6, Mass.

The principal new feature is the swiveling headstock which has a dog drive plate on one end for conventional grinding and a 5" D-1 cam lock nose on the other end for mounting chucks or fixtures. To change from a dog-drive setup



to a chucking operation, it is only necessary to rotate the headstock 180° and set up the work. When work is being ground on dead centers, the chuck does not rotate because the headstock is a combination live and dead center type.

A work speed range of 40 to 400 r.p.m. in an infinite number of increments is available at the turn of a dial. No direct current source is required as the headstock drive is a.c. controlled through rectifiers.

Quick changes from and to internal grinding is made possible by the hinged bracket internal grinding spindle which is readily lowered into position for use. It is not necessary to swivel the wheel assembly for internal grinding. This means greater speed and convenience in performing both internal and external grinding on the same piece since the setup need not be disturbed.

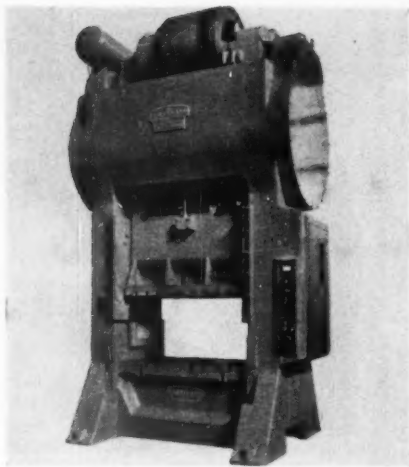
Another feature that increases the versatility of the Type U-4 machine is a 1½" dia. hole running clear through the headstock spindle to provide additional capacity for long shafts.

Other advantages include a combination lever and hand wheel operated footstock and the convenient grouping of electrical controls in an elevated enclosure. Pumps and motors are mounted in accessible locations; table ways are pressure lubricated from an outside reservoir, and the coolant tank has a ramped outlet to assist tank clean-out. The machine is wired in accordance with J. I. C. electrical standards. A power wheel head rapid traversing positioning mechanism is also available for this machine.

Use ACTION Card, opposite page 64. Encircle No. 113

New Cleveland two point press

This Cleveland two point press is double geared, twin drive and is equipped with electrically controlled, air operated drum type friction clutch with spring loaded brake. The flywheel also is provided with



an auxiliary air brake to bring it to a quick stop when the power is shut off.

The slide is counterbalanced by air and the press is arranged with two safety blocks which are used when die setting. These blocks are provided with safety plugs so that when the blocks are pulled out the control circuit is made inoperative.

The die area is lighted from both sides by lights placed in the inside of the up-rights.

The press has a stroke of 8"; a 6" adjustment, 26" distance bed to slide, stroke down and adjustment up; 42" x 60" bed and slide area; operates at 20 to 40 RPM and has a capacity of 350 tons. The Cleveland Punch and Shear Works Co., Dept. B, Cleveland, Ohio.

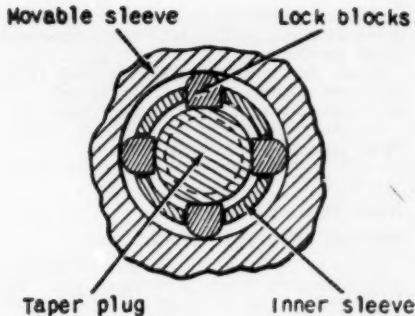
Use ACTION Card, opposite page 64. Encircle No. 114

New Logan locking chuck

The Logansport Machine Co., Dept. B, Logansport, Indiana, has announced its new P.R.O. (Power Release Only) chuck.

One of the outstanding features of the new chuck is said to be the safety factor. It will remain locked in closed position until it is positively opened by the operator. Neither centrifugal force nor power failure will cause release of the work as the chuck is revolving on the machine spindle. The body of the chuck is slotted radially to accommodate the jaws. Jaws are moved in a radial direction by means of bell cranks.

The sleeve is moved by the draw stud which acts through a set of locking blocks.

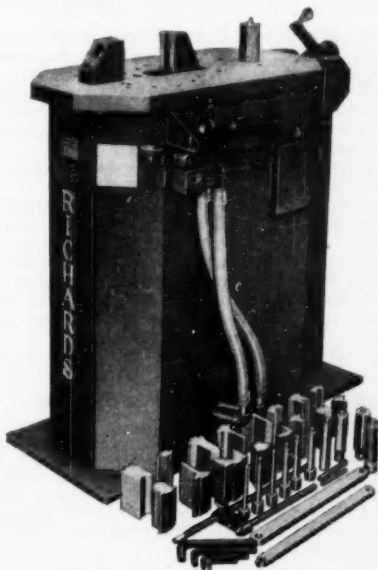


These locking blocks are inserted in holes in a small inner sleeve and engage an internal taper on the movable sleeve. The locking action is produced by the wedging of these blocks against a tapered plug placed inside the movable sleeve.

Use ACTION Card, opposite page 64. Encircle No. 115

Multiform benders

J. A. Richards Co., Dept. B, Kalamazoo, Mich., claims a faster method of changing setups on the stationary head, now built of alloy steel for greater strength, on their



multiform benders. It is said to eliminate special tooling cost, reduce setup time and boost production.

These benders, for forming bus bars, brackets, stampings, springs, steel rule dies, etc., come in hand and air models.

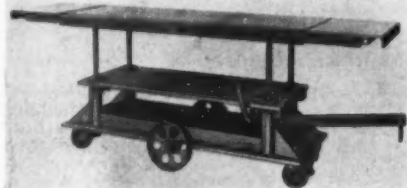
Shown is the big brother, B model, 1/4"x4" capacity, air-operated.

Use ACTION Card, opposite page 64. Encircle No. 116

New help for handling narrow sheets or strip

Claimed to be a device for improving production without increasing cost, the Portelvator (R) is said to measurably increase the ease of handling narrow sheet or strip material from storage, and at and between a series of machine operations. It is made by the Hamilton Tool Co., 826 South Ninth St. at Hanover, Hamilton, Ohio.

The top table surface, which has a 14" adjustment between 24" above floor level



and 38" above floor level, is 26" wide and 72" long. Drop leaves are provided also, which increase the table length to 108" maximum. These leaves are supported by four pull bars, which retract into a space provided under the top table surface.

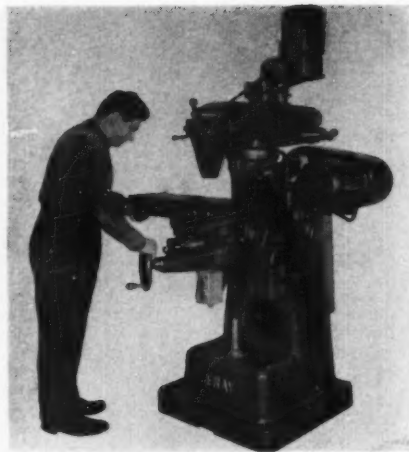
Capacity of the table is 5,000 pounds; this weight is easily removed from "low" to "high position" through the standard Portelvator principle of power transmission, which utilizes an arrangement of worm, worm gear, and screw actuated by a hand crank located on the side of the table. Four point support of the load removes possibility of tipping on ramps or uneven floors.

Use ACTION Card, opposite page 64. Encircle No. 117

Power feed units now available for Fray milling machines

The Fray Machine Tool Co., Dept. B, 2935 North Ontario St., Burbank, Calif., has announced addition of two new power feed units as accessories to the company's line of high precision milling machines.

The power feed units are of two types:



A table unit for Models 10-R and 10-RH; and a power down feed for the Type 4 Fray All-Angle milling attachment. Both units will be sold as attachments for new machines.

The table power feed is arranged for pick-off gears from 1/2" to 13" and includes a 1/3 h.p. motor built right into the unit. This unit is attached to the saddle of the machine for rigidity.

Head power feed unit is arranged for three feeds—.0015, .003 and .006 per revolution.

Use ACTION Card, opposite page 64. Encircle No. 118

Chicago-Latrobe Harduty drills Type No. 1750

Chicago-Latrobe Harduty drills are manufactured with high speed steel bodies and with a heavy duty carbide tipped



point. They are designed to drill accurate holes in hardened die steel, heat treated to Rockwell C-40 to C-65. These tools are generally used in tool room applications.

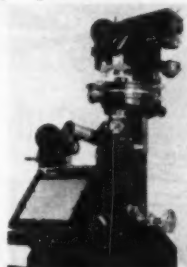
These drills are said to produce holes in hardened steel with good surface finish and without annealing the walls or surrounding surface of the hole.

They are available as regulars in the size range from 1/16" through 3/4" in increments of 1/32" dia. Chicago-Latrobe Hard duty drills are also available in sets containing sizes 1/8", 3/16", 1/4", 5/16", 3/8" and 1/2". Chicago-Latrobe, Dept. B, 411 West Ontario St., Chicago 10, Ill.

Use ACTION Card, opposite page 64. Encircle No. 119

Metallograph versatile, simple for microscopic optical projection

The construction and design of a new Metallograph manufactured by William J. Hacker & Co., Inc., features versatility and simplicity of operation combined with a brilliant optical system, according to the company.



All controls are operated from a sitting position. Transitions are instantaneous. Accessories are interchangeable.

The Reichert Metallograph permits one to quickly perform all known methods of microscopic examinations.

Incident Light: bright ground, dark ground, oblique, polarized, phase—positive and negative (for metallography); transmitted light: bright ground, dark ground, oblique, polarized, phase—positive and negative; mixed light: incident plus transmitted light.

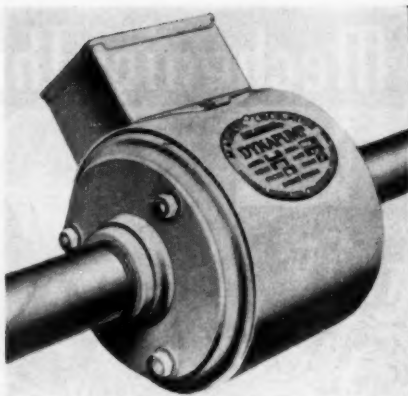
Some features claimed include: drawing and projection; grain size measuring eyepiece; interference testing (for surface finish); low power macro-photography; micro hardness testing; microscope desk with built-in controls; miniature camera attachment; phase contrast for metallurgy.

Use ACTION Card, opposite page 64. Encircle No. 120

Magnetic pump requires no shaft seal

A new type of magnetic pump for home and industry has been announced by The Fostoria Pressed Steel Corp., Dept. B, Fostoria, Ohio.

Known as the Dynapump, this novel



centrifugal pump is driven by a rotating magnetic field instead of the usual drive shaft. This feature makes possible a low cost, leakproof motor and pump unit that eliminates the need for a shaft seal, the major cause of conventional pump troubles. Now available in fractional horsepower sizes, standard units are of stainless steel for pumping most fluids; other materials for special purpose usage also are available.

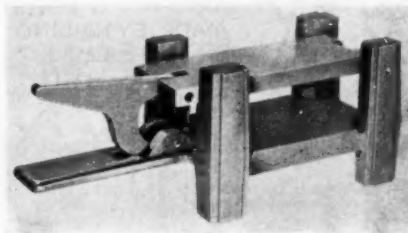
Use ACTION Card, opposite page 64. Encircle No. 121

Leaf jig

A new leaf jig for drilling, tapping, and reaming is announced by West Point Mfg. Co., Dept. B, 26935 W. 7 Mile Rd., Detroit 19, Mich. The manufacturer states that the jig is ready for immediate use by merely nesting part and inserting bushings.

The jig has precision made steel lid and cam—semi-steel body, .002 parallelism is held between lid and machined base. Used in any position—top-bottom-two sides. For a different operation, just install a new lid. It is made in 11 base sizes 1 1/2"x2" to 6"x6"—2 to 3 heights each. Template sheets available.

Use ACTION Card, opposite page 64. Encircle No. 122



Mechanics Through the Ages



TO PROVE TO DOUBTING **IRON WORKERS** ASSEMBLED IN HIS SHOP, THAT HE HAD ACTUALLY DISCOVERED A QUICK AND CHEAP WAY TO MAKE MALLEABLE STEEL FROM **PIG IRON** BY BLOWING AIR ON MOLTEN IRON, **WILLIAM KELLY** OF KENTUCKY, IN 1846, HAD A BLACKSMITH TAKE PIECES OF THE WHITE HOT METAL, TOSS IT ON HIS ANVIL—AND FASHION HORSE SHOES AND NAILS ON THE SPOT!

Aperty

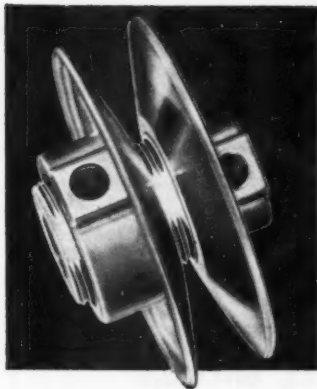
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300 AD,**

ROMAN CRAFTSMEN
TURNED OUT DELICATELY FINISHED
ARTIFICIAL LEGS
MADE BY NAILING
BRONZE SHEET
TO WOODEN
CORES!



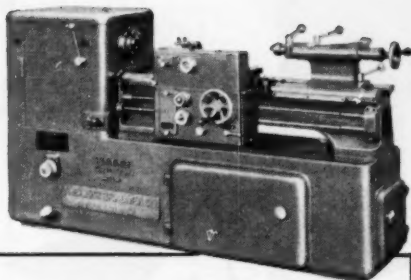
PIONEER 14TH CENTURY GUN
FOUNDERS OF EUROPE FRE-
QUENTLY WERE ORIGINALLY
BELL FOUNDERS WHO ALSO
PRODUCED HOUSEHOLD
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**CRI-DAN "B" high-speed
threading machine**



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On the male piece the operation involves boring the hole, facing the flange and threading to a length of one inch. Diameter of threaded portion is also one inch. The internally threaded piece is chamfered and threaded, thread length approximately $\frac{3}{4}$ inch. Using the Cri-Dan "B" results in more "first rate" pieces, fewer rejects in less time than had been possible previously.

Yes, Cri-Dan "B", using a single carbide-tipped tool, has established new standards for accurate, fast precision threading.

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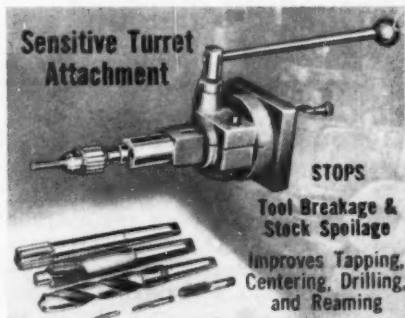
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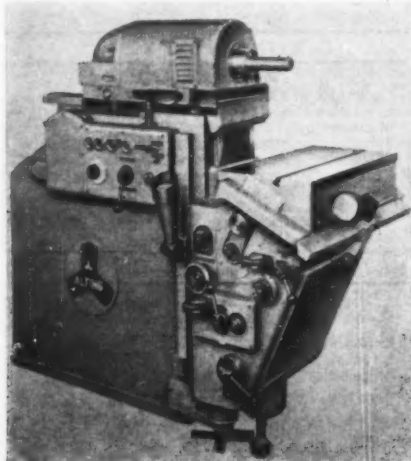
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c/o Machine and Tool Blue Book
WHEATON, ILLINOIS

Versatile jig borer

With the newly developed Alfing universal fine jig borer, Model HFS O/K 250, it is possible to produce both small and large runs without complicated fixtures, according to Morey Machinery Co.

This is accomplished by the arrangement of the work table with optical settings. The height of the knee and the cross adjustment of the table are combined with the optical reading device for setting the machine to extreme accuracy.

The feed movement of the headstock slide and the longitudinal traverse of the cross slide are controlled hydraulically. The feed of the headstock slide is infinite-



ly variable from .236" to 12" per minute.

The spindle speed of the headstock is infinitely variable within a range of approximately 300 to 3000 rpm by means of a set incorporated into the body of the machine. Morey Machinery Co., Inc., 410 Broome St., New York 3, N.Y.

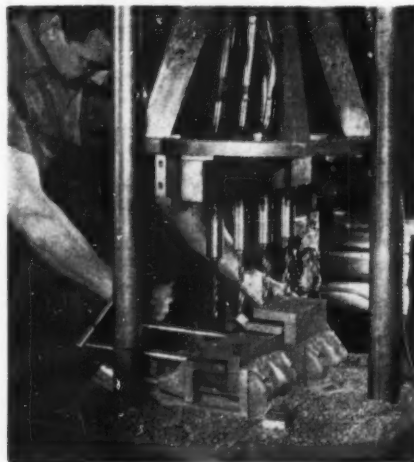
Use ACTION Card, opposite page 64. Encircle No. 145

Speed Vise increases multiple drilling production

Speed Vise, originally designed as a drill press vise, has heretofore been used as a single unit, for single drilling of various parts without the necessity of large drill jigs and other fixtures.

Speed Vise is a complete quick-acting clamping mechanism which will accommodate a wide variety of parts. It is manufactured by Cardinal Machine Co., Dept. B, 1819 Dana St., Glendale, Calif.

For multiple spindle, semi-automatic drilling machines, the use of two or more Speed Vises enables the operator to com-



plete multiple drilling operations without the necessity of jigs and fixtures.

This vise employs a patented screw thread. The operator simply lifts, slides and locks.

Odd shaped parts which require full travel of the jaw for loading and unloading are handled as easily as small uniform parts requiring only a short travel. No time is wasted in needlessly winding the screw in and out. Only a half turn is needed to unlock and a half turn to lock.

Use ACTION Card, opposite page 64. Encircle No. 146

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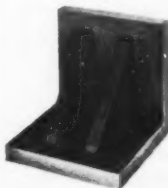
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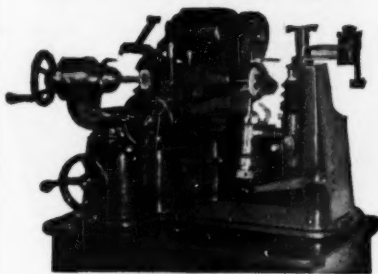
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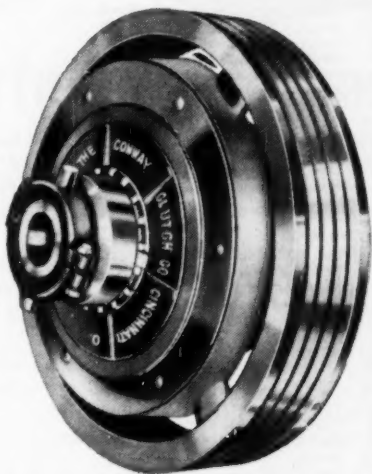
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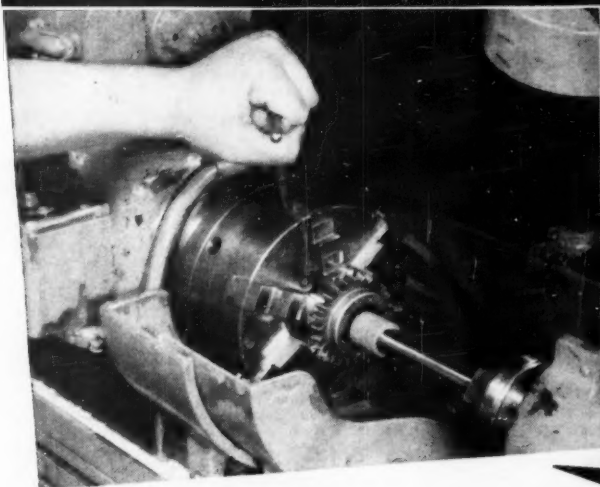
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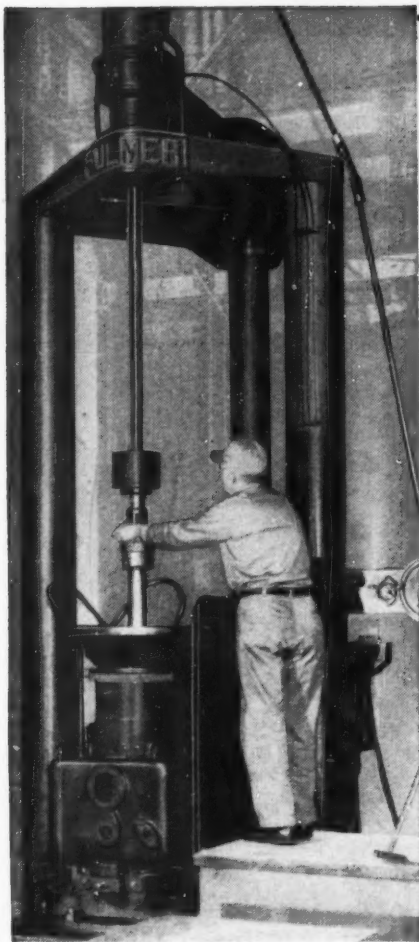


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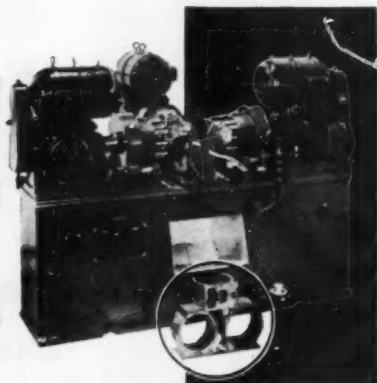
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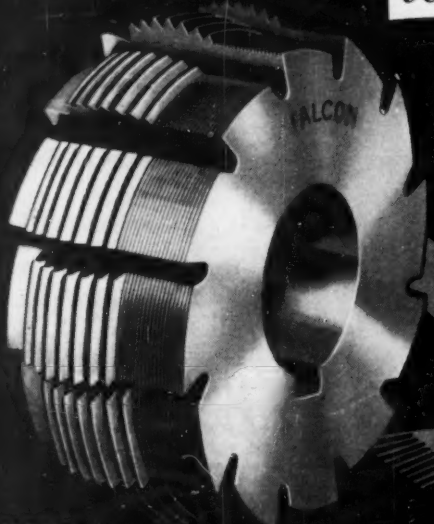
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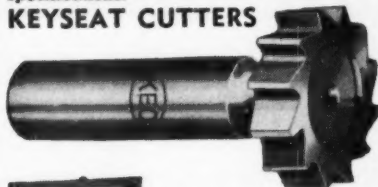
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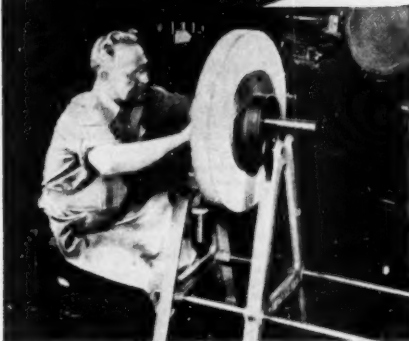
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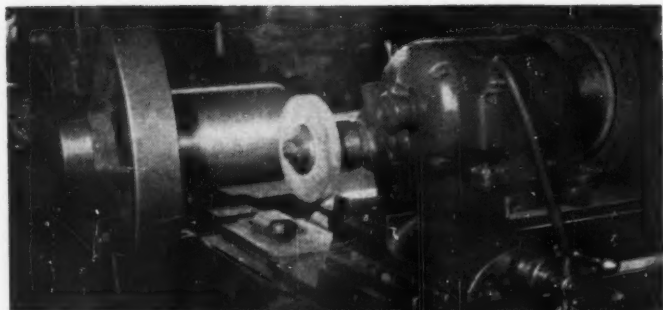
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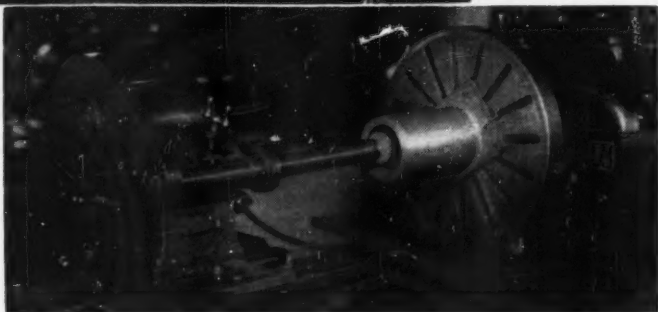
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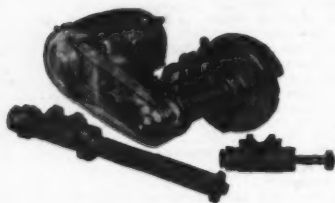
EXTERNAL

(Wheel Guard removed for clarity)

INTERNAL ▶



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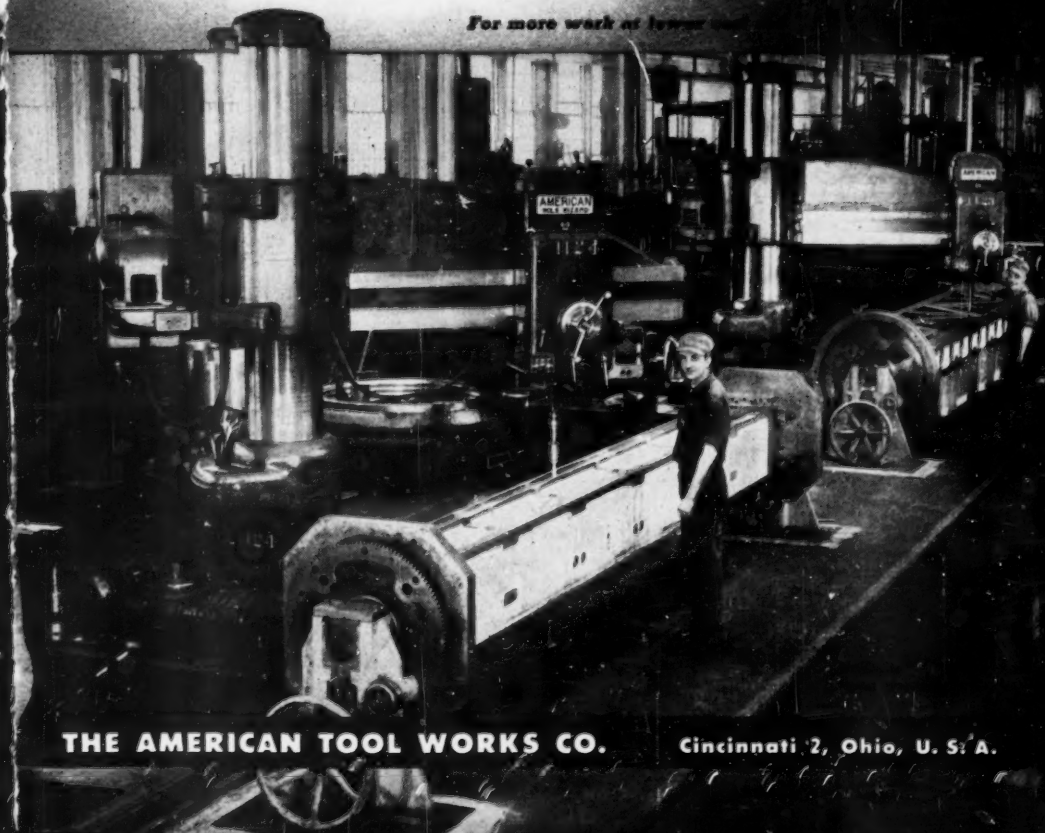
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